Better Homes and Gardens®

WOOD®

INDEX
Projects, tips, techniques from issues 17 through 24

THE MAGAZINE FOR HOME WOODWORKERS

$3.95

OCTOBER 1988•ISSUE NO. 25
Display until October 11

10 LAYOUT TOOLS
no woodworker should be without

TOUR A MODERN-DAY FURNITURE FACTORY
See page 38

BECOME A FRAMING PRO
Master the techniques framers use daily to preserve artwork

START BUILDING HOLIDAY GIFTS NOW!
Kid's wheelbarrow
Mini safe
Bill/key keeper
Turned napkin rings
Rolling pin and rack
Zoo carousel
Cattail centerpiece
Glue caddy
Oval marker

SHOWCASE YOUR COLLECTIBLES IN THIS CURIO CABINET
See page 60

10
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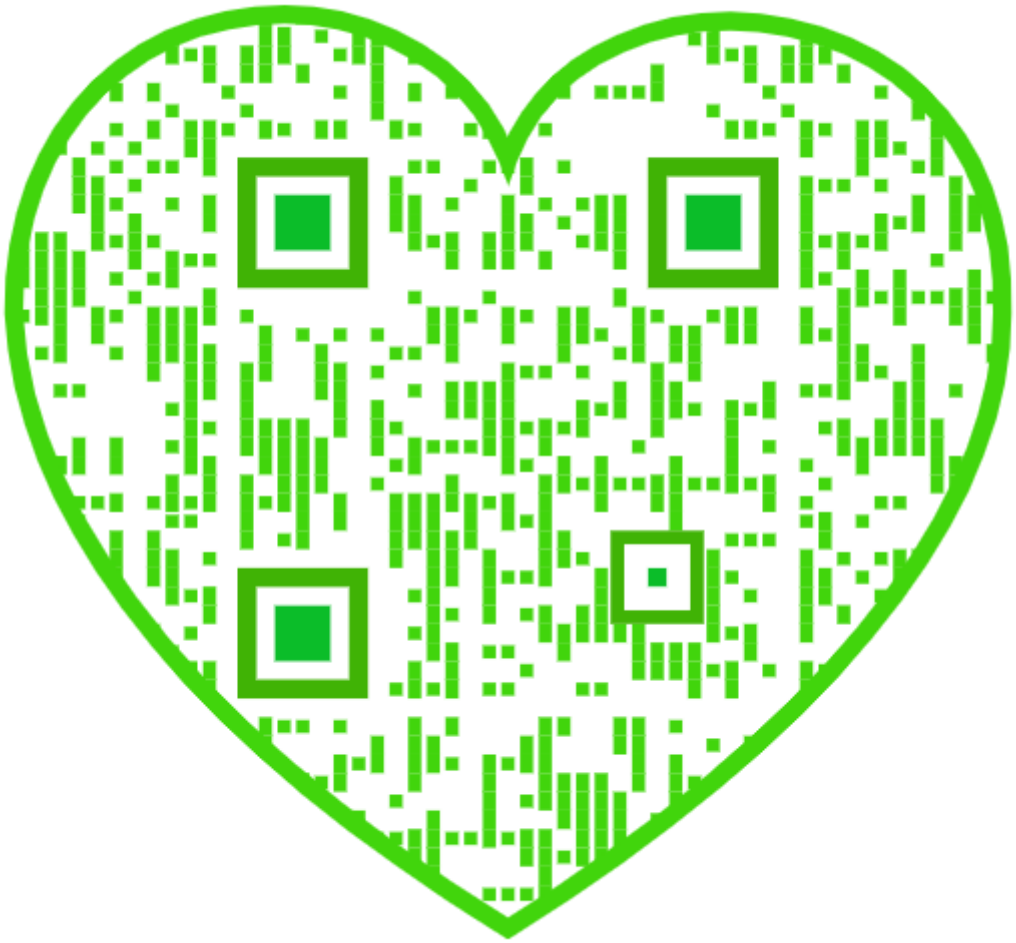

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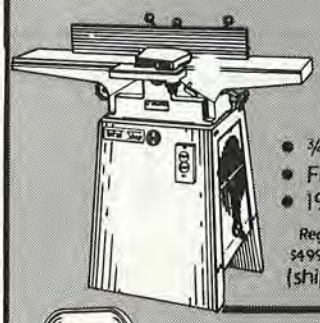

6" Heavy Duty Jointer

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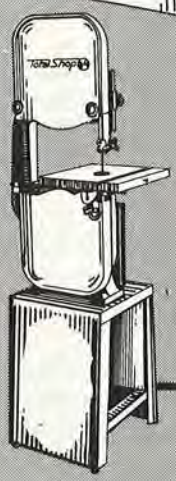

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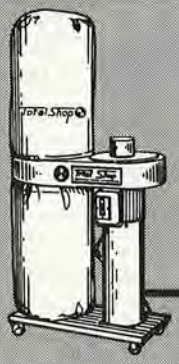

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- 4" inlet
- Commercial quality
- Compact size

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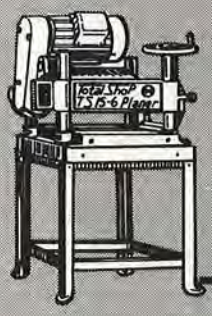
(Shp. & Hdlg. $30.00)



TS 15-6 Planer

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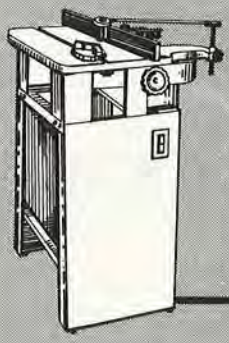

Wood Shaper

- ½" Spindle
- 1 hp
- Cast iron construction
- Precision fence
- 160 lbs.
- Ball bearings

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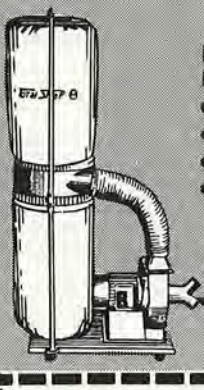

Industrial Dust Collector

- 2 hp, 110v
- Two 4" inlets
- 1185 CFM
- 125 lbs.

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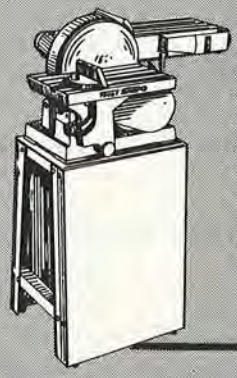

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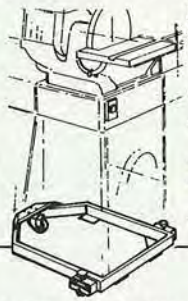

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Better Homes and Gardens®

WOOD®

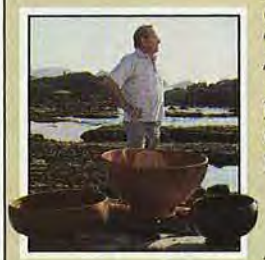
This issue's cover wood grain: zebrawood

OCTOBER 1988 ISSUE NO. 25

WOOD PROFILE

SASSAFRAS: THE LOOK-ALIKE WOOD BETTER KNOWN AS TEA 33

Native Americans have long valued sassafras for its medicinal value. Today's woodworkers treasure sassafras, too, because of its attractive grain. Learn more about an American species with a distinctive aroma.



CRAFTSMAN CLOSE-UP

TURNINGS BY THE SEA 34

The Weston family produces more than exceptional photographs. Neil, a son of Edward Weston, has made a name for himself at the lathe. Find out how Neil turns humongous bowls in Carmel, California.

CRAFTSMANSHIP BY THE CARLOAD 38

The automated production lines at Thomasville Industries bear several resemblances to your home workshop. Take a closer look at a company that consumes veneer by the mile.

SHOP-TESTED TECHNIQUES

YOU CAN FRAME LIKE A PRO 42

Woodworkers who focus on building an attractive frame may easily overlook the importance of properly preserving artwork. This article shows how to do it!

HOMEMADE TOOL

OVAL MARKER 48

It's a bonus when a reader drops by our shop to show off a device to simplify a tricky task.

EXOTIC WOOD NAPKIN RINGS 50

An importer of Central and South American hardwoods shows how he turns thin napkin rings from exotic wood scraps.

CUMULATIVE INDEX — ISSUES 17 to 24 51

Our index covering the last eight issues will save you time when you're searching for one of our projects, techniques, or other articles.

DEVELOP YOUR SHOP SKILLS

GET SMOOTH RESULTS WITH YOUR BELT SANDER 55
A belt sander in untrained hands can severely gouge carefully assembled boards. Don't let this helpful tool get the best of you.

UNCOMMON STOCKS 56
Over coffee in Warsaw, Missouri, you're liable to hear folks bragging about the local stock market. That's right: Warsaw's Reinhart Fajen, Inc., produces America's most prestigious line of gun stocks.

SHOWCASE YOUR COLLECTIBLES WITH THIS STUNNING CHERRY CURIO CABINET 60
When you build this cabinet, you'll appreciate the four identical sub-assemblies that simplify the construction. Then, watch the cherry cabinet appreciate over the years right along with its valued contents.

10 LAYOUT TOOLS EVERY WOODWORKER NEEDS 66
Whether you're drawing precise plans at a drafting table or executing them at your workbench, we have a list of tools you shouldn't be without.

ON-THE-GO GLUE CADDY 68
A good idea from our shop organizes your glue and gluing supplies.

PRESEASON HOLIDAY PROJECTS

ROLL OUT THE WHEELBARROW 70
Our early-bird holiday gift section opens with a pint-size hauler that kids will love.

FANCIFUL ZOO CAROUSEL 72
We can just about guarantee that the spinning action of this wild-animal carousel will catch the eye of young and old.

TURNED ROLLING PIN 74
You'll appreciate the display rack accompanying this project.

OAK SAFE AND BILL/KEY KEEPER 77
Brass post office lockbox doors highlight two practical gifts. Build one as a decorative safe and hang the other for keys and correspondence.

HANDCRAFTED CATTAILS AND REEDS 80
Whip up a handful of these roadside favorites in an evening for someone special on your gift list.

SHORT FEATURES

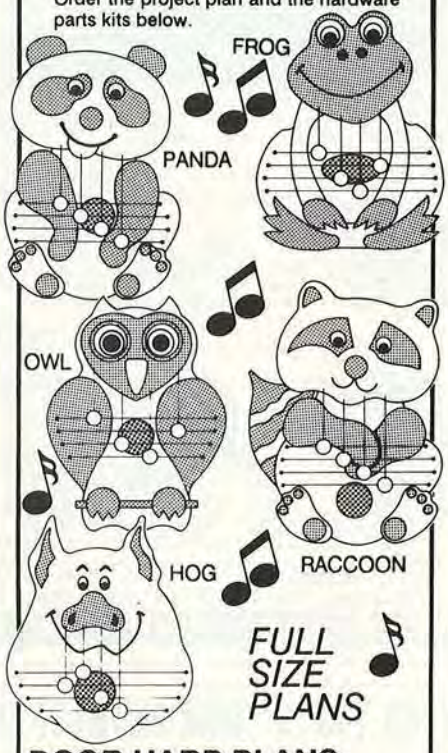
Editor's Angle	6	Old Hand Ways	22
Talking Back	10	Lathe Tool Rests	26
Tips from Your Shop (And Ours)	16	Products That Perform	83
		Magazine Customer Service	96

Finishing Touches . 104

DOOR HARPS PLANS & KITS

WHAT'S A DOOR HARP?

Mounted on the inside of your door, a door harp will welcome your guests with a beautiful musical tune each time the door is opened. You'll find it easy to build these door harps in your shop using only standard 3/4" stock and our special Hardware Parts Kits.
Order the project plan and the hardware parts kits below.



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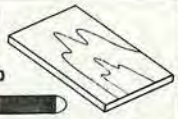

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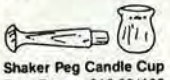

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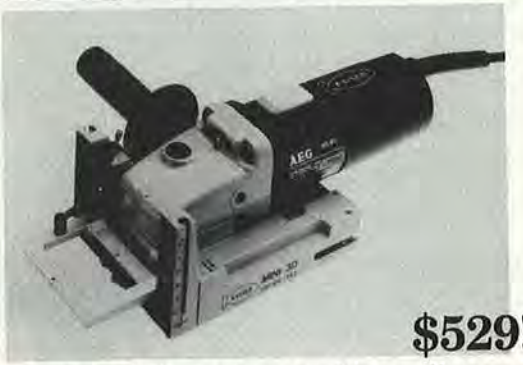

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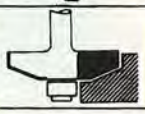	#15	Raised Panel	20° Angle	1-5/8"	1/2"	$25.00
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THE EDITOR'S ANGLE

BRIAN TAKES THE BLUE... AGAIN

At the Iowa State Fair, Brian Gutzmer and *WOOD*® magazine Project Builder Jim Boelling show off Brian's blue-ribbon-winning 4-H project.

So far, 15-year-old Brian Gutzmer from rural Council Bluffs, Iowa, has a perfect record. Every time he enters a woodworking project in a 4-H competition—most recently at the Iowa State Fair—the judges see blue. I'm happy to report that *WOOD* magazine had a small part to play in Brian's latest award-winning achievement—he built the thickness sander from our October 1985 issue.

Of course, Brian does have the edge on his competition. This fine young woodworker got his start in woodworking at age 2 when, with his first hammer and saw, he signed on as a "remodeling helper" for his dad, Marlin. No wonder he's so successful!

As you probably know, 4-H projects follow a certain theme each year. This time, it was "projects that extend resources." So the young wheels started turning, and Brian decided to use some wood that he and his dad had sawed from logs on their farm. "I used red elm where I needed strength and walnut on those parts that required hardness," Brian told me. To further extend his resources, this frugal woodworker recycled the plastic-laminated top from an old table for the sander feed table.

Brian also kept track of the material costs as part of his project. Even counting the $23.50 he invested in pillow blocks and bearings and another $10 for a used motor and pulley, Brian completed the project for less than $60. Now that's a bargain.

Keep up the good work, Brian.

Print this article

Larry Clayton

P.S. Brian wrote me not long ago and said that for this year's project he's building a 12x20' workshop! We could be looking at a future WOOD *magazine project builder here, folks.*

Photograph: Craig Anderson

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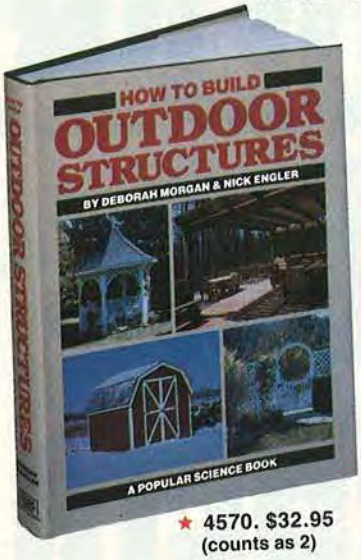

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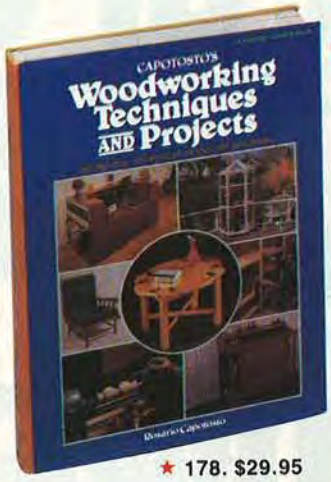

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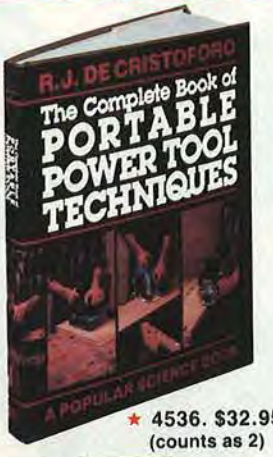

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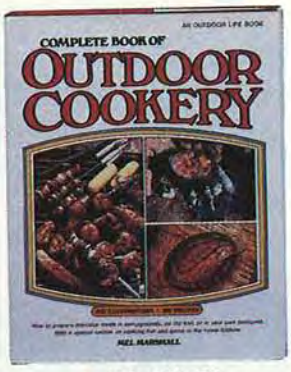

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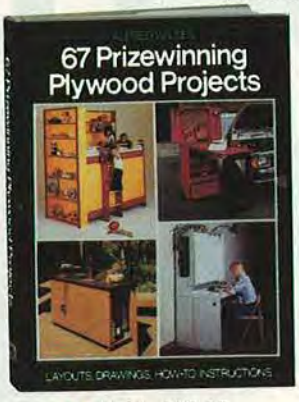

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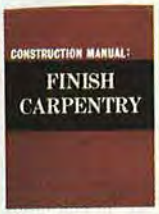

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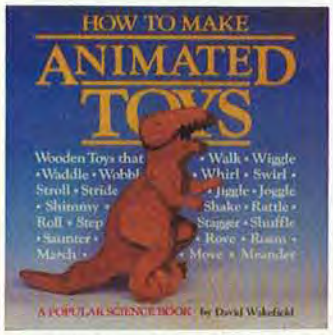

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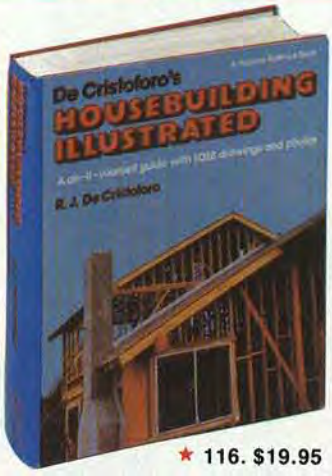

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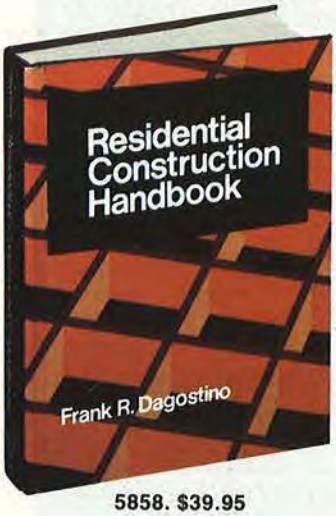

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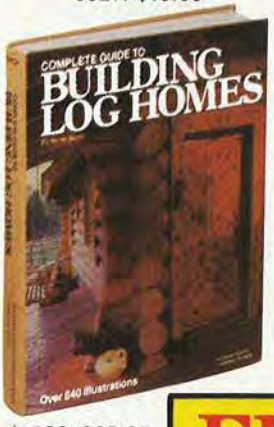

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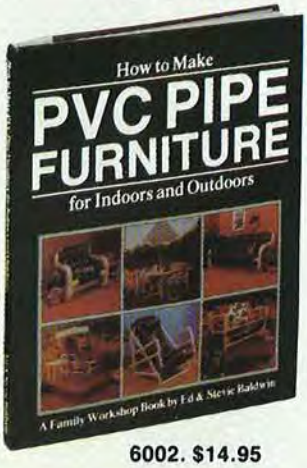

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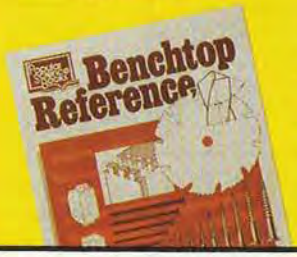

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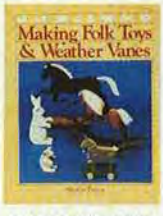

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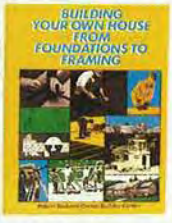

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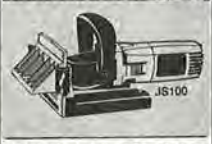

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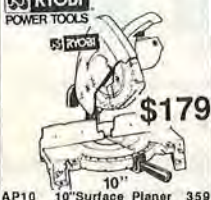

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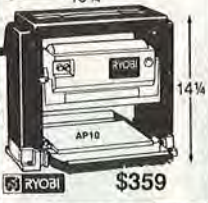

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TALKING BACK

We welcome comments, criticism, suggestions, and even an occasional compliment. The volume of mail we receive makes it impossible to answer every letter, but we promise to do our best. Send your correspondence to: Letters Editor, Better Homes and Gardens® *WOOD*® Magazine, Locust at 17th, Des Moines, IA 50336.

BUCKLED UP IN TENNESSEE

Thank you for the belt-buckle article in the December 1987 issue of *WOOD* magazine. I saw Christmas presents for my family and friends in that project. I didn't have any special woods like the ones shown in the article, but I did have some walnut and white oak logs to use as the base for the buckle. I also had some scrap cedar, red oak, poplar, sassafras, and even some ebony salvaged from an old piano.

First, I glued the accent wood between the oak or walnut. With a piece of double-faced tape, I mounted a 2×4" "jobber stick" to the back of the blank so I could safely sand at my disc sander. I sanded down to a 320-grit, and switched to hand-sanding for a 400- or 500-grit finish. I then applied four or five coats of tung oil, two coats of a gloss finish called True Oil, and two coats of wax.

I finished 40 buckles for Christmas gifts!

—Thomas J. Gillard Jr., Tullaboma, Tenn.

Sounds like you were a busy Christmas elf, Tom. You must be one of those guys who doesn't throw away any scraps of wood!

DON'T FORGET TABLE BOTTOMS

I'd like to comment on David Sloan's letter in the February 1988 issue of *WOOD* magazine about stabilizing wood by using a finish. I wonder if education is replacing common sense.

I agree that there are few—if any—moisture-proof finishes. But moisture-resistant is another thing. Even air resists moisture in some instances. If you lay a wide board flat on the ground overnight, it will absorb dew from the ground and be cupped in the morning. Uneven moisture on opposite sides of a board causes the same cupping action. So it follows that if you coat one side of a piece of lumber with finish and leave the opposite side unfinished, the unfinished side absorbs moisture much easier.

So for whatever reason, why not continue what has worked for generations? Some of us old-timers who didn't know better coated both sides of wide areas such as tabletops. Woodworkers should continue to coat both sides of wide areas as insurance against warping. I've made numerous harvest tables, and have never had even one warp.

—C. A. Brown, Waterville, Vt.

Print this article

Continued on page 12

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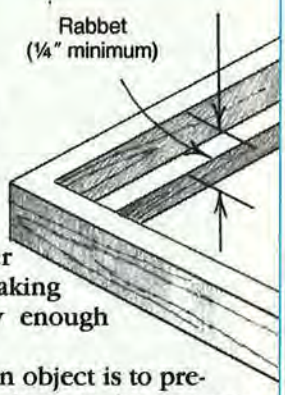
TALKING BACK

Continued from page 10

WHAT'S UP ON RABBETS



Most of the projects in your magazine seem to be well thought out and researched, so I was somewhat shocked in going over the February 1988 issue to see that both the article on making router moldings and the article on making a picture frame do not allow enough room for the picture package.

The true reason for framing an object is to preserve the artwork—it does not have to be museum-quality to need correct framing. The ¼ × ¼" rabbet, and even the ¼ × ⅜" rabbet do not give enough room for the fastening in of a proper picture package. I would say that ¼ × ½" would be the minimum.

I have taught college-level classes on conservation of works of art on paper and frequently consult to museum staffs in this area.

—Richard W. Osborn, Oshkosh, Wis.

Good point, Richard. We asked some other experts, and yes, a rabbet should be at least ½" deep to allow for all the necessary parts, including a spacer between the artwork and glass in some cases.

We've learned a lot about picture-framing techniques in the last eight months. For example, in our sample artwork project on page 47, the glass, mat, mounting board, and backing board make a ½"-thick package; we selected a molding with a 1"-deep rabbet. The point: Know the thickness of your picture package before selecting or making a molding, and make the rabbet at least ¼" deeper.

SANDING DRUMS: NOT MADE FOR ROUTERS

Recently, I overheard a frightening conversation at a store. A customer complained that no one had warned him not to use a sanding drum in his router. The rubber drum partially disintegrated from the centrifugal force and he nearly ruined the router before he could get it shut off. Luckily, he was not injured.

Although few small sanding drums come with instructions, the ¼" or ½" shanks should be used only with lathes, drill presses, or portable drills. Never put a sanding drum in a high-speed router. In addition, the speed of the router is unappropriate for sanding—it would burn the work. Never use anything in the router except bits made specifically for it.

The many collet chucks now being sold for shapers make it possible that someone will try a sanding drum there, also. Even the 9,000 or so rpm of a shaper turns a sanding drum into a dangerous weapon. You can't be safely sand with a shaper without changing the pulleys to lower the speed.

—John Martin, Cumberland, Maine

Continued on page 14

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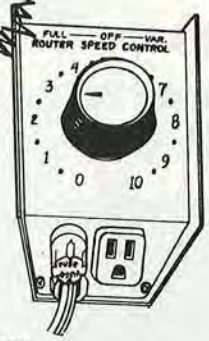

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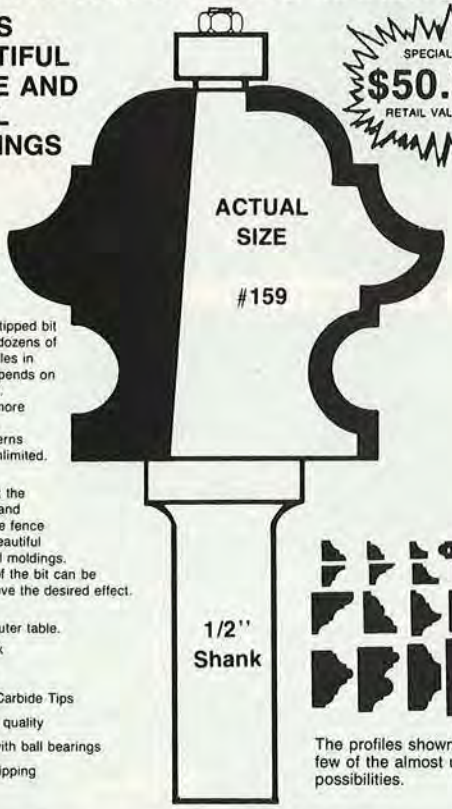

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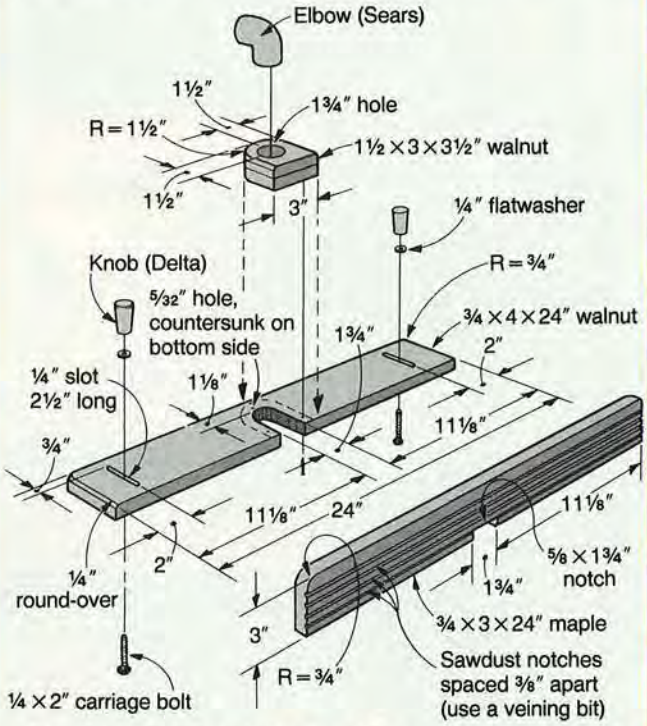
TALKING BACK

Continued from page 12

ROUTER TABLE IMPROVEMENTS

Recently I came across an old issue of *WOOD* magazine. I found the cover of the April 1985 issue, which is devoted to a routing table, highly interesting. I departed from some of the instructions and the results pleased me. Your readers may be interested.

First, rather than use clamps to hold the fence in place, I designed and constructed a sliding fence. This change makes precise fence adjustment a snap. The fence attaches to the table with two ¼×20 carriage bolts and Delta table saw fence knobs (part 1087534). I also substituted a Sears elbow (model 315.16960, part 2-725384-00, division 9, source 113) to eliminate a curve in the vacuum hose.



For the tabletop, I chose ½" acrylic plastic to increase visibility. Because I didn't want to lose ½" of cutting depth, I attached my router to a 3/32" aluminum plate recessed and rabbeted into the table top. Now I can easily pop out the router to change bits.

—Douglas J. Keough, Stroudsburg, Pa.

Because of fine suggestions such as yours, Doug, our great router table gets even better.

STIR UP SOME HOMEMADE PAINT TONIGHT

This is one recipe for milk paint that William H. Mason referred to in his June 1988 "Ask WOOD" question. I found the recipe on a 1923 painter's worksheet: Vigorously beat together 1 cup powdered (dry) milk, 1 cup of water, and 2 eggs. Add colored chalk or red iron oxide to desired consistency. Let mixture stand over night.

—J. Hostetler, Elyria, Ohio

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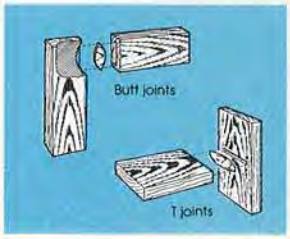
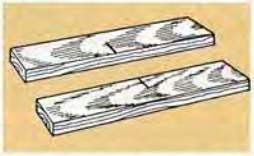


1 Lay Out

The boards that are to be joined should be placed together and the location of each joint marked on both pieces. The vertical fence is adjusted to the depth desired for the slots. Turning the wing nuts on the side of the fence allows it to move easily in the tracks. The fence is accurately calibrated to allow you to easily move it to center of the joint *(See Figure 1).*



At this point, you have determined the horizontal location of the joint by marking the wood and vertical location of the joint by setting the fence.

2 Cut

You are now ready to make the slots for your biscuit joint.

There is a red indicator line on the front of the fence and a corresponding red mark on the base plate *(See Figure 1).* You can use either of these marks for alignment with the lines drawn on the mating pieces of wood.

With the wood securely held in place, align the red mark with the line on the board. With one hand you can grasp the body of the machine. The other hand is placed on the handle. Turn the machine on and, with a steady forward motion, push the joiner body forward to make the biscuit slot. Repeat the process for each marked area on all of the wood pieces.

Simple and Easy!!! The wood particles are automatically ejected through the machine's exhaust port.

3 Assemble

Apply a water based glue to the slots and surfaces being joined. Insert the biscuits in the slots and push the boards together. For best results you will need to clamp the joint together for the glue manufacturer's recommended drying time.

There you have it, 1-2-3!! An extremely strong joint produced quickly and easily by you and the Freud Joiner Machine.

You will find a complete instruction "How to" book with each machine. Illustrated with photographs and drawings, it is designed for those woodworkers not familiar with biscuit joinery. The Freud biscuit joiner will prove to be a highly valued tool for your woodworking projects.

At a List price of $285.55, the Freud JS100 Joiner Machine is now on sale through your local Freud distributor for $195.00.

MITER JOINTS? NO PROBLEM!

By reversing the fence, you can join mitered pieces (See Figure 2). *The steps are the same.*

Figure 1

Mark the location of your joint and set the fence to the vertical height needed. Line up the fence with the mark and make your cut. Apply glue — insert biscuits — clamp!

Figure 2

Booklet

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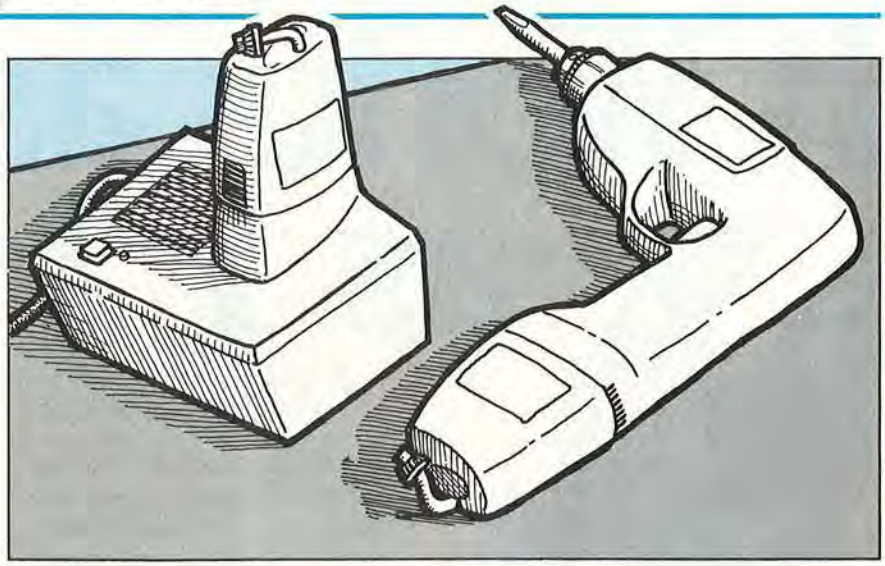
STAY CHARGED UP

The cordless drill is a super convenience—unless you regularly use one all day long. Prolonged operation runs down the battery, meaning you have to stop drilling while it recharges.

TIP: When you buy a cordless drill, invest a few more dollars in an extra battery pack. This allows you to continue drilling while the other battery pack recharges. Now you can drill for hours on end and never have to stop in the middle of a job for lack of a charge.

—Dan Miller, Elgin, Ill.

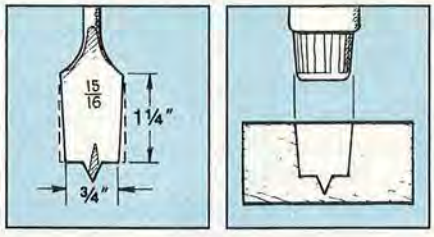


TAILOR A BIT TO FIT YOUR TAPERED CANDLES

When boring holes for conventional taper candles 8 to 12" long, a standard spade bit will not produce a snug fit. The holes will be either too large at the bottom, which permits the candle to flop back and forth, or too small for the base to be inserted properly.

TIP: Modify a spade bit of the appropriate size—15⁄16" matches standard tapered candles. Scribe lines on the bit so it tapers from a 15⁄16" diameter to 3⁄4" as shown *below*. With a bench grinder, fully remove unwanted material. Finish the cutting edge with a sharpening stone.

—John Wolf, St. Joseph, Mo.



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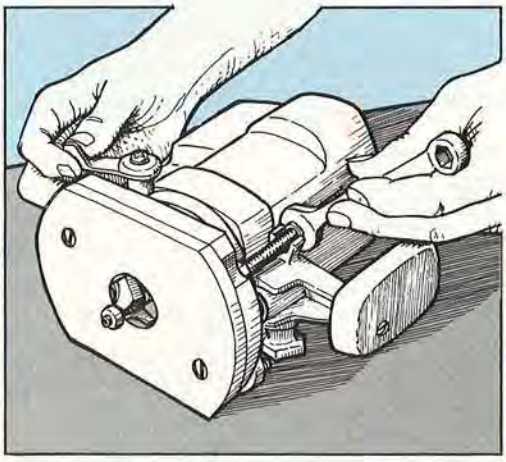
TWO TIPS FOR PLUNGING TO PRECISE DEPTHS

Plunge routers excel in certain operations, such as making signs, cutting dados and rabbets, making hanger holes in the back of plaques, and molding edges. Many of these jobs require precise cutting depths.

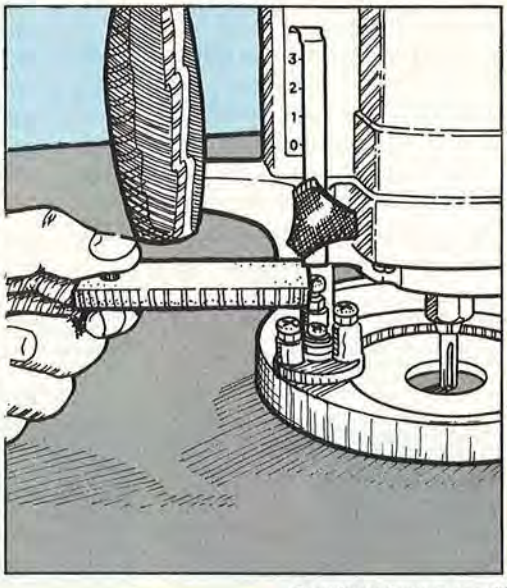
TIP #1: To fine-adjust plunge routers with thread-rod depth adjustments for exact depth of cut, plunge the bit slightly deeper (about 1⁄16") than desired and lock into place. Bring down the upper nut on the rod until it comes into contact with the router housing. Now, release the lock and slowly loosen the nut, allowing the router's spring action to lift the bit to the precise depth. Tighten the nut to prevent any vertical movement.

—From the *WOOD* magazine shop



TIP #2: Using the depth gauges on plunge routers often creates an irritating variance in rabbet and dado cuts. Try this remedy: Cut a set of precision shims or gauges made of hardwood, metal, or plastic in common thicknesses such as 1⁄8", 1⁄4", 3⁄8", and so on. A convenient size is 3⁄4" × 3". Drill a 1⁄4" hole in one end for hanging and label each block according to its thickness. Use these to preset your router depth consistently as shown at *right*.

—Eugene Fischer, Houston



Continued on page 18

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TIPS FROM YOUR SHOP (AND OURS)

Continued from page 16

PLAY IT SAFE WITH SHORT, THIN SLICES OF WOOD

Every once in a while, a project calls for narrow wooden strips which you would normally rip from larger pieces of stock. But if you're caught with only small pieces of stock that you need to cut into even smaller dimensions, it may be difficult and hazardous to run them through a table saw.

TIP: Use glue to edge-join narrow or short sections of stock to longer and wider sizes of scrap wood (see drawing *below*) to give you larger work pieces and increase your margin of safety.

—Robert N. Stuckey, Houston

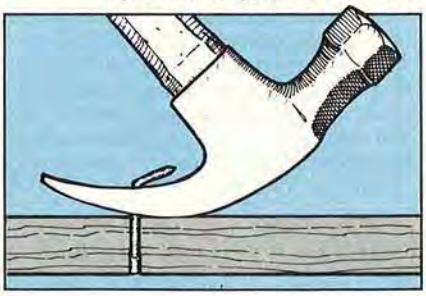
A GRIPPING IDEA FOR NAIL REMOVAL

You can almost count on the wood splitting when you attempt to pull a finish nail from wood trim or molding you wish to recycle.

TIP: Pull these nails through the back side by bending the shank over slightly so your claw hammer can grab it more easily.

Even better, grip the shank of the nail with the jaws of a diagonal wire cutters, slip the hammer claw between the wood and the cutters, and pry out the nail. If any holes remain in the finished face of the molding, fill them with putty.

—Myron S. Levy, Gold Hill, Ore.

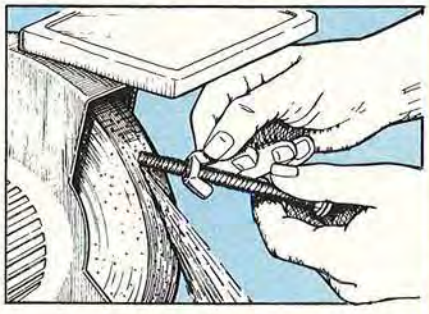


KEEP THREADS OPEN WHEN CUTTING BOLTS

Occasionally, it's necessary to cut off a bolt that's too long for a specific job. Hacksawing the bolt usually closes the threads, making it very hard—if not impossible—to start the nut.

TIP: Thread on a wingnut prior to sawing the bolt, then grind the sawed end on a grinding wheel or belt sander, rotating the bolt 360°. Now the wingnut, which aids in holding the bolt during grinding, will help open the threads completely when spun off. If the wingnut doesn't spin off with little effort, grind the bolt until you can easily remove it.

—From the *WOOD* magazine shop

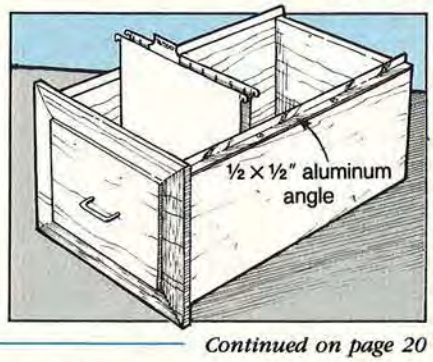


ON TRACK FOR HANGING FILES

Hanging files keep drawers marvelously organized, but they require a metal frame insert to support them. The insert looks out of place in wooden files you've built yourself.

TIP: Mount lengths of ½×½" aluminum angle on the top edge of each drawer side, as shown, *below*. Now, the drawer will support hanging files so you won't need the standard, unattractive racks.

—Craig K. Carlson-Stevemer, Arden Hills, Minn.



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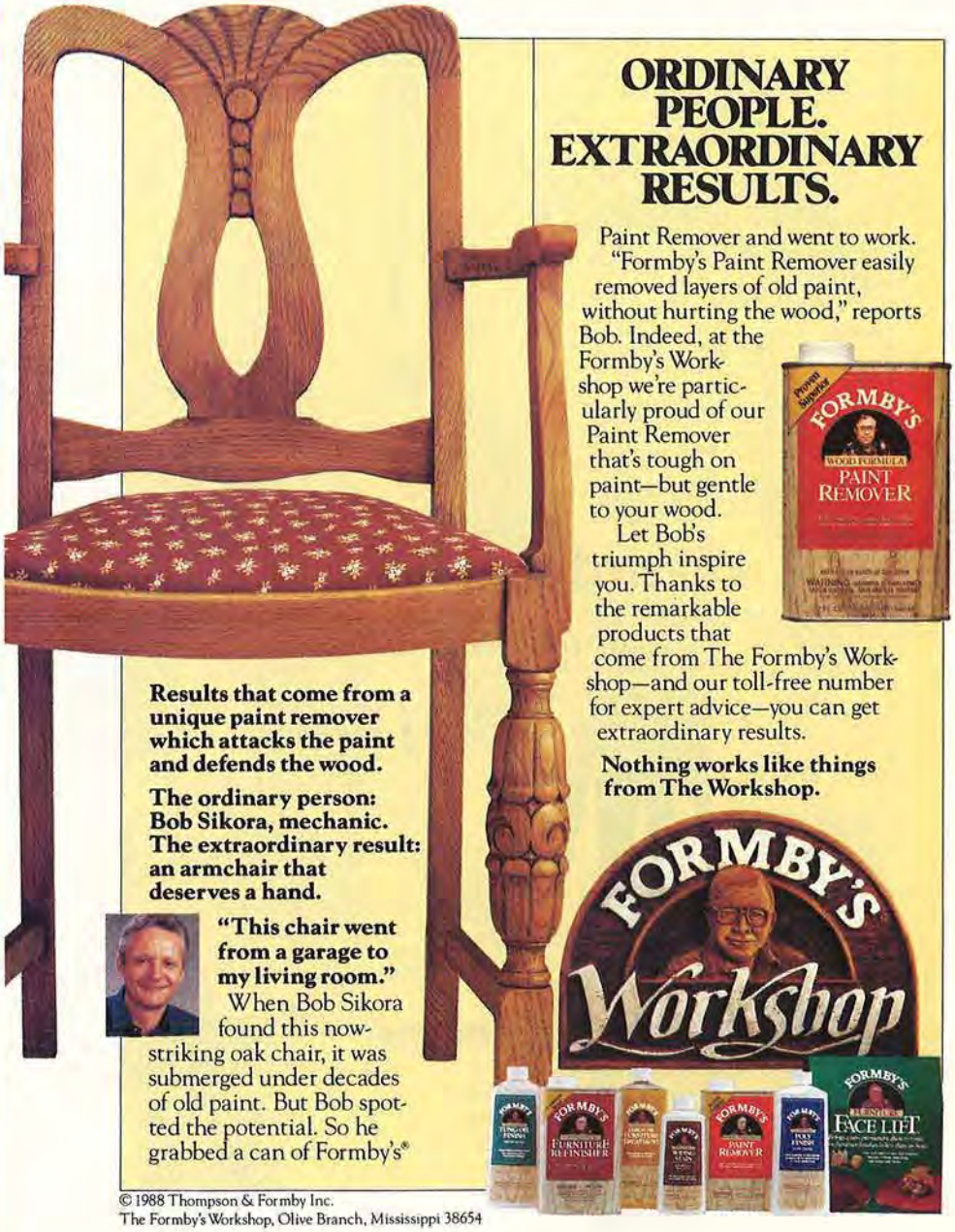

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TIPS FROM YOUR SHOP (AND OURS)

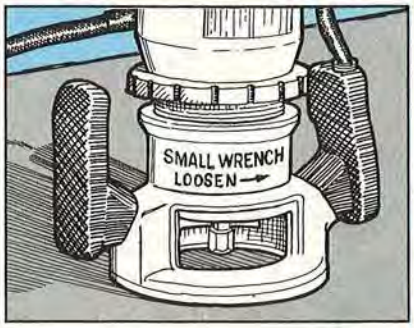
Continued from page 19

WHEN YOU DON'T KNOW WHICH WAY TO TURN

If you're like us, you may have a devil of a time remembering whether to turn the wrench clockwise or counterclockwise to loosen or tighten the collet that holds router bits.

TIP: Label the tightening direction on the router body with a permanent marker so you'll make the right move every time.

—From the WOOD magazine shop

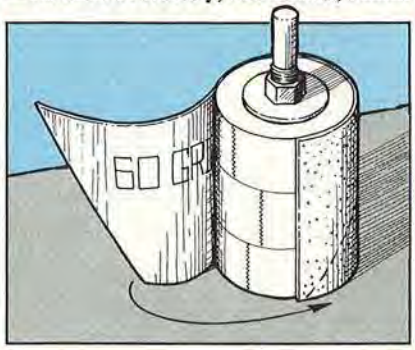


ONE WAY TO BEAT THE (SANDING) DRUM

Being in the middle of a project and finding out you don't have the right size or grit of sanding sleeves for a drum can be a frustrating experience.

TIP: Use double-faced carpet tape to attach the appropriate grade of conventional sandpaper to your sanding drum. First, cover the drum with tape, leaving the protective film on the outside. Cut a strip of sandpaper wide enough to cover the drum, tapering one end at an angle. Fit in place, penciling a line where the ends meet. Cut so the sandpaper ends butt together. Remove the tape's protective strip and affix the sandpaper.

—Thomas P. Rockey, Northfield, Minn.



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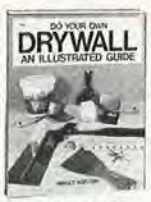

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THE OLD KITCHEN TABLE

"What a great ax! It's had two heads, seven handles ...and it's still going strong!" — Ancient joke

An American masterpiece, the walnut drop leaf, inspired the third incarnation of the family heirloom table.

I grew up convinced that the Pilgrims had their first Thanksgiving dinner on the same walnut tabletop where I ate my cornflakes. "Sure, it's had some repairs," said my mother, "but this old table has been in our family since 1627." It wasn't until adulthood, when the table had passed down to me, that I first suspected the integrity of our cherished family tradition. Unless history recorded a hingemaker named *Stanley* on the Mayflower, something was incredibly wrong with our heirloom drop-leaf table.

The pine tree and the trestle

Through careful research (and a heavy dose of imagination), I have solved the mystery of our family heirloom. Our walnut drop-leaf table did actually begin in 1627—but as a pine trestle table!

In the beginning, it measured 2′ wide and 12′ long, just large

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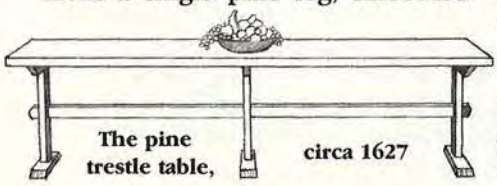
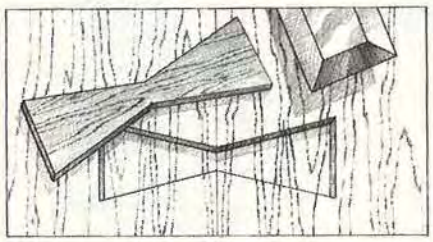
enough for family and friends. The two massive top planks were split from a single pine log, smoothed



The pine trestle table, circa 1627

with an adz and plane, then joined along their underside with wooden dovetails, like the one shown.

After joining and gluing the tabletop boards, carved, butterfly-shaped pieces of wood were set across the seam and their outlines carefully traced with a knife. Then the recesses were chiseled out and the dovetails glued into place.



"Butterfly" dovetails

The drunkard, the drop leaf, and the restoration

Our family table underwent its first major renovation, at the hands of its third owner, just after the American Revolution. An old soldier, beset with the fever, had taken the "two-hat cure"—he put his hat on the table and drank apple brandy until he saw two hats!

Unfortunately, during the curative stupor, his candle burned through the tabletop. But, the old soldier had the right replacement: three walnut boards won in a horse race. Shortening the stretchers, he made it into a large card table.

As often happens, however, the wood used by the old soldier was better than the craftsmanship. This, coupled with the odd match of the walnut top and the pine trestle base, motivated the table's seventh owner to have it restored as genuine "Colonial" table.

This happened when the centennial of 1876 was fast approaching. The local cabinetmaker chopped up the pine base for kindling, replacing it with a proper one of carved walnut with swing-out, knuckle-jointed side legs.

Cutting the knuckle joints was easier than it looked. With chisels and planes, the cabinetmaker shaped the ends of the two boards into partial cylinders. He then cut away the alternating sections from each cylinder to allow them to intermesh. Iron rods through their centers completed the wooden hinges. The length of the knuckle joints gave stability to the swing-out legs that supported the drop

Continued

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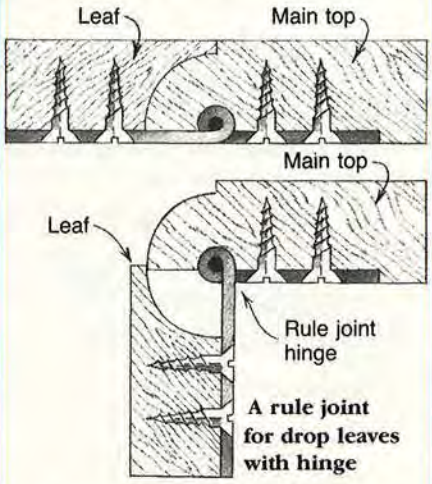
OLD HAND WAYS

Continued from page 23

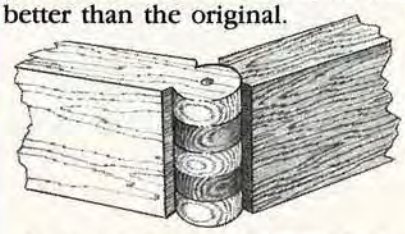
leaves he recut from the "original" walnut table top.

The cabinetmaker joined the drop leaves with rule joints—so-called because of their resemblance to a folding ruler. They were ideal because the main top supports any load on the leaf.



A rule joint for drop leaves with hinge

Hinges made for rule joints differ from common ones. They have countersunk screwholes on the opposite side from the raised hinge knuckle. Shaping the hollow and round elements of the rule joint with his two molding planes, he knew that the table was better than the original.



A knuckle joint for swing-out legs

Finally, the table came down to me with not an original piece in it. I am still very proud, though, of my walnut, drop-leaf table that began as a pine tree.

By Roy Underhill
Master housewright at Colonial Williamsburg in Virginia and host of the popular PBS series *The Woodwright's Shop*, Underhill is also an author and lecturer.

Photograph: Courtesy Colonial Williamsburg
Illustrations: Jim Stevenson

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MAKING A GOOD LATHE EVEN BETTER

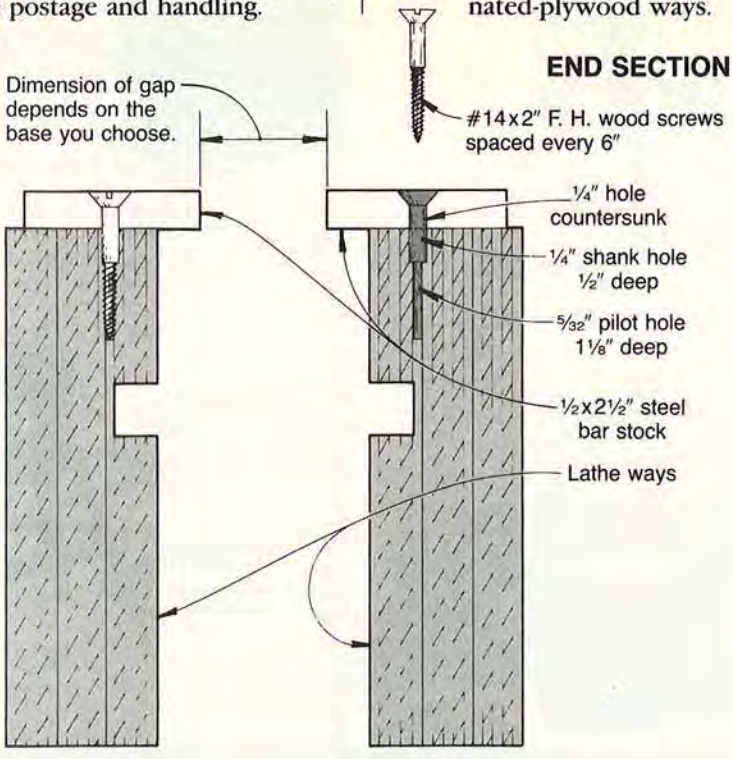
Our shop-built lathe, featured in the April 1987 issue of *WOOD* magazine, has proven to be popular.

In addition to the original model here in our shop, we've had people on staff build them for their personal workshops. And, according to our suppliers, more than 200 readers have ordered the parts to build their own.

After many hours of use, we found our homemade tool rest wasn't as easy to use as most commercial models. Striving for improvement, we ordered several tool rests and bases, and tried them on our lathe.

Which is the best? It's hard to say. Each performed well (admittedly better than our homemade version), so we decided to show you the four we tested, and let you choose the best system for your needs. The prices listed include postage and handling.

We added ½x2½x64" steel strips to the top of the ways for three of the tool-rest bases to track on. The steel and cutting cost us $25 at a local machine shop. The fourth base, made by Conover, tracks on the wooden ways of the lathe as designed. The drawing *below* shows the steel strips screwed to the laminated-plywood ways.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Lathe ways

Continued on page 28

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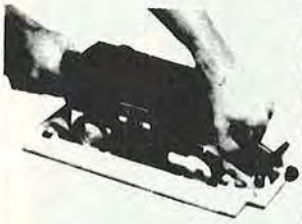

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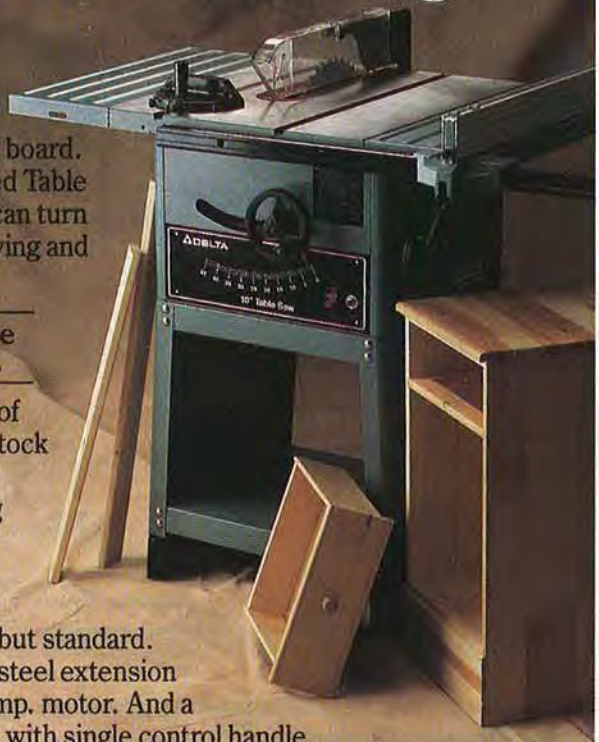

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LATHE

Continued from page 26

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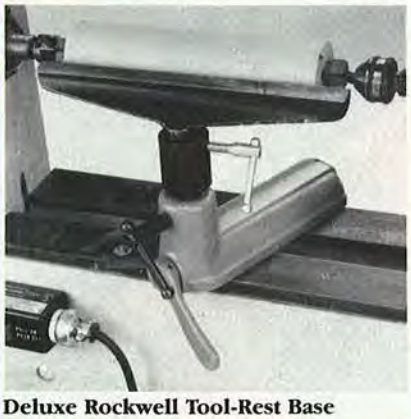
At the low end of the price spectrum, the Rockwell standard base (no. 46-831) retails for $42. Both this unit and the deluxe Rockwell base require a custom-made height-adjustment adapter ($25). The adjustment adapter is available only from the source listed *below*. The 12"-long rest (no. 46-692) sells for $15, a 4" rest (46-690), $13; and an outside French curl (no. 46-405), $13. The gap between the steel strips measures $1\frac{5}{8}$" for both this base and the Deluxe model listed *below*. Our source: Puckett Electric, 1011 Keo Way, Des Moines, IA 50309; 800-544-4189.

Standard Rockwell Tool-Rest Base

Sturdier and more expensive, the Rockwell deluxe tool-rest base (no. 46-171) shown *below* retails for $105. The attachments mentioned *above* for the standard base also fit this model. From Puckett Electric, address and phone number listed *above*.



Deluxe Rockwell Tool-Rest Base

Continued on page 30

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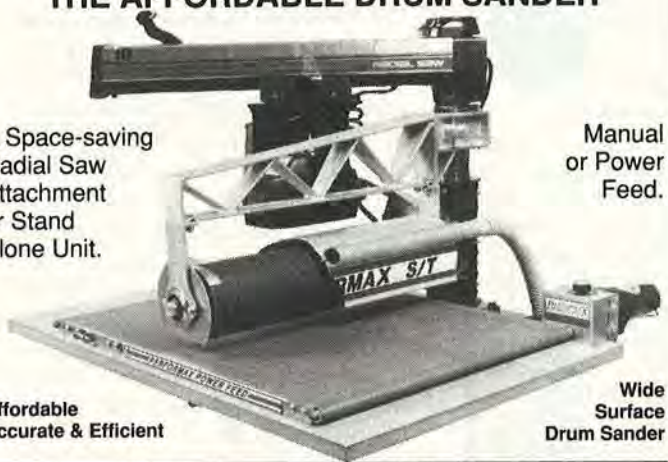

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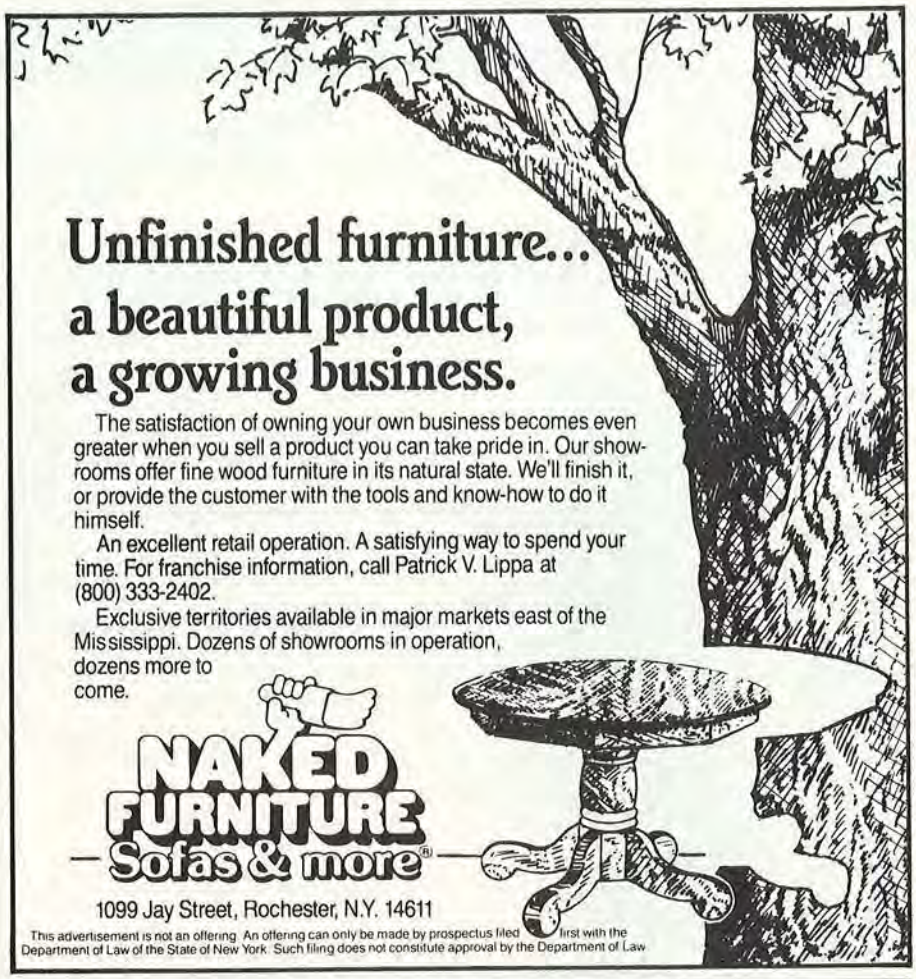

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LATHE

Continued from page 28

Bowl turners will love General's extended base. It's 13½"-length makes reaching the outside of a large bowl a breeze. The S-curve bowl rest shown *below,* makes turning the curved surfaces of bowls easier with less chatter. The rest allows you to support your turning tool next to the curved surface—something not always obtainable with a straight rest. The G-264 base sells for $109 and the S-curve rest (BR500) with 5" shaft sells for $47. The gap between the steel strips measures 1⅞". Craft Supplies, 1287 E. 1120 S., Provo, UT 84601; 801/373-0917.

General's Extended Tool-Rest Base

The Conover tool-rest base shown *below* mounts to the ways without adding the steel strips. (Our lathe already had the strips permanently attached before we took the picture.) The base (CL16-300), which sells for $75, tightens to the ways by the use of a handwheel located below the ways. The 12" rest (CL16-306, shown in the photo) sells for $26. The 6" (CL16-307) rest sells for $24 from Conover Woodcraft Specialties, 18125 Madison Rd., Parkman, OH 44080; 216/548-3481.

Conover Tool-Rest Base

Photographs: Bob Calmer

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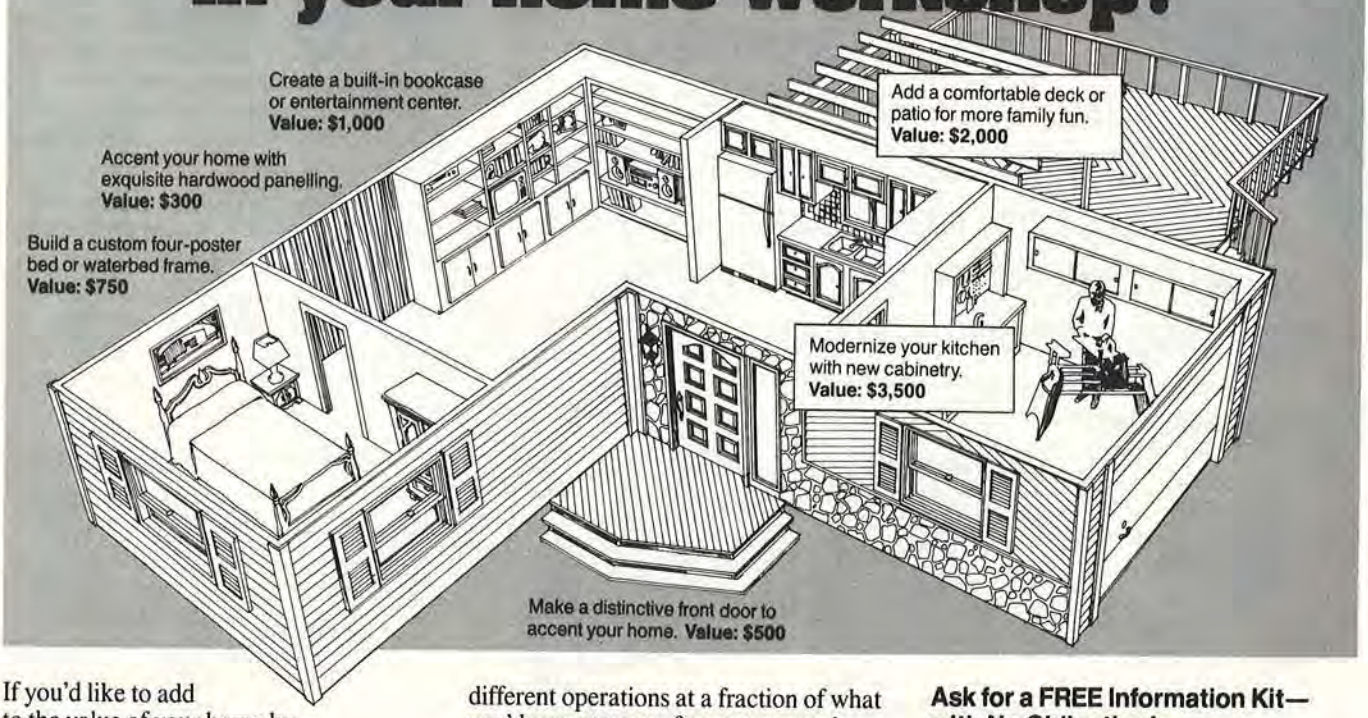
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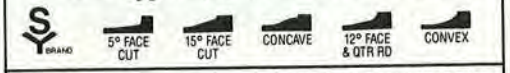

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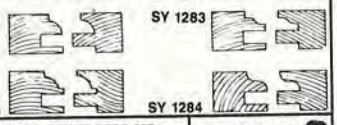

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PART NO.	D	PRICE
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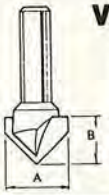
*804½	1/2	$6
806	9/16	$8
810	3/4	$8
*810½	3/4	$8
*812½	1	$10

Flush Trimming

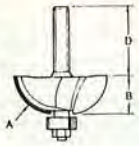
PART NO.	A	PRICE
S8012Y	3/8	$7
S8016Y	1/2	$8
*S8016Y½	1/2	$8
S8020	5/8	$10
*S8020½	5/8	$10

Vee Groove Bits



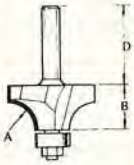
PART NO.	A	PRICE
S112	3/8	$10
S114	1/2	$10
S128	3/4	$12
*S128½	3/4	$18
S130	1	$20
*S130½	1	$24

Cove Bits



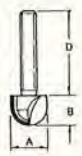
PART NO.	A	PRICE
S702Y	1/16	$11
S704Y	1/8	$11
S706Y	3/16	$11
S708Y	1/4	$12
S710Y	5/16	$12
S712Y	3/8	$12
S716Y	1/2	$13
*S716Y½	1/2	$14

Roundover



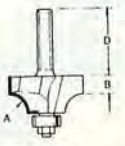
PART NO.	A	PRICE
S502Y	1/16R	$10
S504Y	1/8R	$10
S506Y	3/16R	$10
S508Y	1/4R	$10
S510Y	5/16R	$11
S512Y	3/8R	$13
S516Y	1/2R	$15
*S516Y½	1/2R	$15
*S520Y½	5/8R	$18
*S524Y½	3/4R	$18
*S528Y½	7/8R	$30
*S532Y½	1R	$30
*S536Y½	1-1/4R	$38

Core Box



PART NO.	A	PRICE
S408	1/4	$9
S412	3/8	$10
S416	1/2	$11
S420	5/8	$12
S424	3/4	$14
*S424½	3/4	$14
*S432½	1	$15

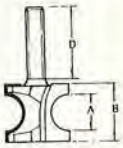
Beading



PART NO.	A	PRICE
S602Y	1/16R	$11
S604Y	1/8R	$11
S606Y	3/16R	$11
S608Y	1/4R	$12
S610Y	5/16R	$13
S612Y	3/8R	$15
S616Y	1/2R	$15
*S616Y½	1/2R	$15
*S624Y½	3/4R	$18

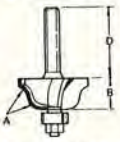
*Indicates ½" shank.

Bull Nose



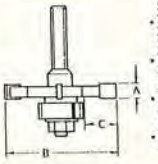
PART NO.	A	PRICE
SY9-1	1/4	$12
*SY9-1½	1/4	$12
SY-9-3	3/8	$14
*SY9-3½	3/8	$14
SY9-4	1/2	$14
*SY9-4½	1/2	$14
SY9-5	5/8	$15
*SY9-5½	5/8	$15
SY9-6	3/4	$15
*SY9-6½	3/4	$15
*SY9-8½	1	$17
*SY9-9½	1-1/8	$25
*SY9-10½	1-1/4	$30
*SY9-11½	1-1/2	$38

Roman Ogee



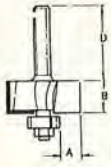
PART NO.	A	PRICE
S5705Y	5/32	$15
*S5705Y½	5/32	$15
S5708Y	1/4	$16
*S5708Y½	1/4	$16

Slot Cutter - 4 Flutes



PART NO.	A	PRICE
SY7002	1/8	$20
*SY7002½	1/8	$20
SY7004	5/32" (4mm)	$20
*SY7004½	5/32" (4mm)	$20
SY7006	3/16	$20
*SY7006½	3/16	$20
SY7008	1/4	$20
*SY7008½	1/4	$20

Slot Cutters/ Rabbeting Bit



PART NO.	B	PRICE
S1702Y	1/16	$10
S1704Y	1/8	$10
*S1704Y½	1/8	$10
S1706Y	1/4	$11
*S1706Y½	1/4	$11
S1708Y	3/8	$11
*S1708Y½	3/8	$11
S1712Y	1/2	$12
*S1712Y½	1/2	$12

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SASSAFRAS

The look-alike wood better known as tea

Sassafras

Native Americans turned the bounty of the land into the essentials of life. The tree that the Narragansett Indians called *sasauaka-pamuch* was no exception. Long before European explorers landed on the continent, the tree yielded its roots, bark, and leaves for a medicinal brew believed to cure everything from sore eyes to diarrhea.

Colonists coined the word sassafras from the Indian's language. And from the tree's healing properties, they coined profits from export. Sassafras tea was touted across the ocean as a tonic to "thin the blood and purify the system."

To those pioneers who used the wood, sassafras became well known as long lasting. Because it resists rot in contact with the ground, farmers sunk it for fence posts and split it for rails. Since it was light and absorbed little water, sassafras also was ideally suited for canoes and cooperage.

In the woodshop, sassafras often becomes a substitute for chestnut. It also resembles ash, and mixes well with it in furniture manufacturing.

Wood identification

Ancestors of sassafras (*Sassafras albidum*), a truly American species, grew across the continent during early geologic periods. Now, it's found from southern Maine south to central Florida and west to the Mississippi River Valley and eastern Texas.

In its northern range, sassafras rarely grows larger than shrub-size. But in favorable conditions in North Carolina and Tennessee, sassafras trees may reach 5′ in diameter, 100′ tall, and live 1,000 years.

Sassafras rarely grows in stands. Instead, it mixes with white oak, persimmon, and sweet gum. You can pick it out by its normally flat-topped crown or twisted branches sticking straight out from the trunk. Old trees have deeply furrowed, reddish-brown bark with flattened ridges, and appear as if they had been washed with light gray. The bark of young trees looks reddish, but has cracks instead of furrows.

Sassafras leaves are a dead giveaway—they have three long lobes, often misshapen, and varying in size, even on the same branch. If you have any doubt, sniff. All parts of the tree have a pleasant, medicinal odor.

Although its coarse grain mimics ash or chestnut, sassafras wood weighs less. Dry, it weighs only about 30 lbs. per cubic foot. Wood from older trees has a red-brown color; from younger ones, a yellow-tan. There's little color difference between heartwood and sapwood.

Working properties

A soft hardwood, sassafras works easily with only hand tools. Planing, however, requires care so you don't lift the grain. And, you'll find the wood brittle and not very strong, characteristics that demand glue when joining. Fasteners alone won't hold in the wood.

Sanding sassafras poses no problem. It takes a fine finish.

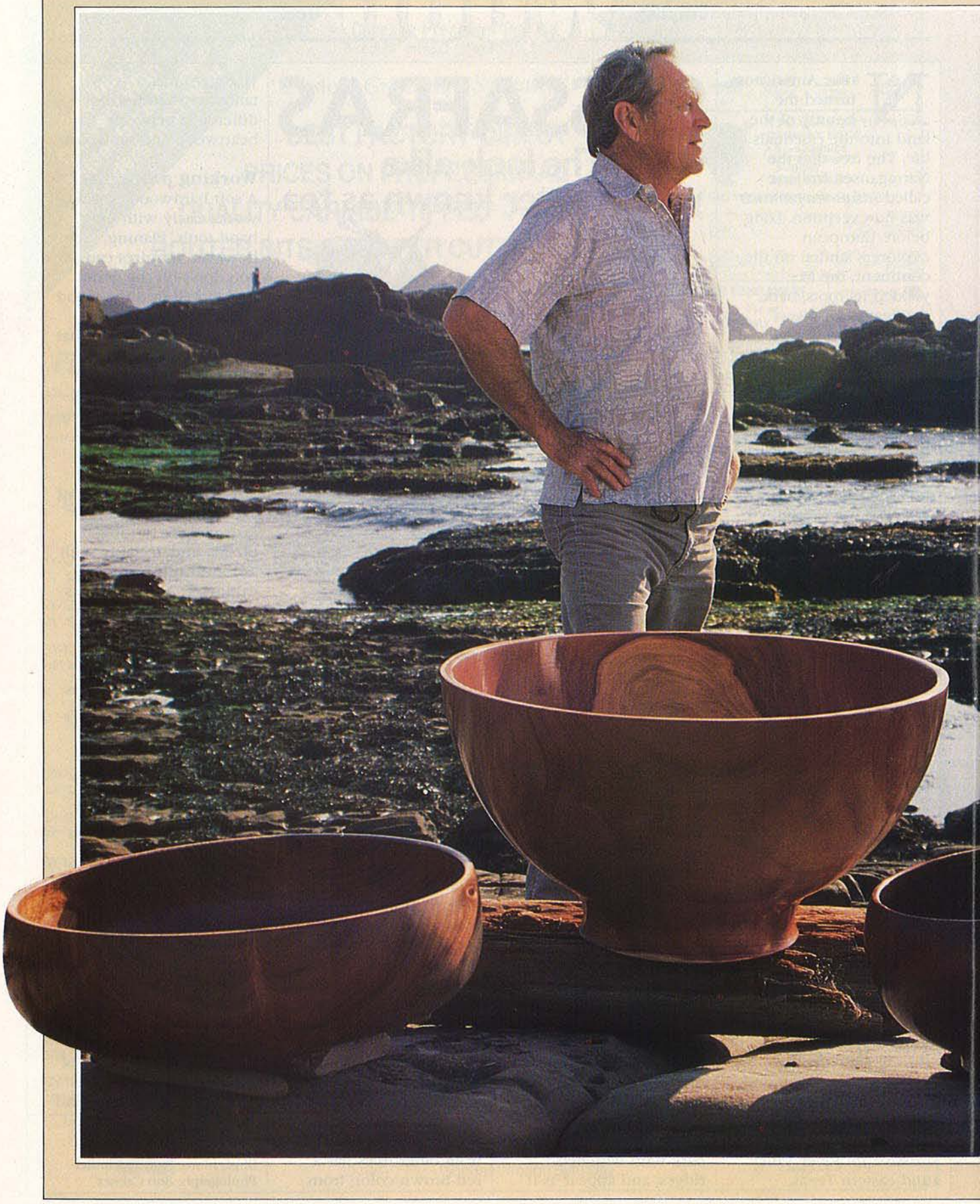
Uses in woodworking

When not required to bear weight, sassafras blends undetectably with ash in furniture and cabinetry. And due to its likeness to chestnut, the wood often imitates the long-lost classic in antique reproductions. Woodturners and carvers with sharp tools easily work sassafras' unusual grain patterns into eye-catching pieces.

Cost and availability

The occasional sassafras sold by hardwood lumber outlets costs about $1.75 per board foot. It rarely will be more than 1″ thick and wider than 8″. When mixed and sold with ash, it carries a higher price. To be sure what you're buying, scrape or abrade a fresh surface to release the unmistakable odor of sassafras in the wood. Very seldom will you find sassafras sold as plywood or veneer.

Illustrations: Steve Schindler
Photograph: Bob Calmer



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TURNINGS
BY THE SEA

With a view of Point Lobos and the Pacific beyond, California turner Neil Weston turns gargantuan bowls on his humongous lathe.

To photo buffs, the Weston name stimulates images of natural forms defined by the effects of changing, controlled light. Edward Weston was a photographer challenged by his environment—seashells strewn with kelp, twisted cypress roots on Point Lobos, endless sand dunes, and even garden-variety green peppers. In the thirties and forties, he recorded such scenes forever on film.

Neil Weston learned photography from his father. But, unlike his brothers, he chose not to pursue it. "I didn't like being couped up inside with chemicals," he remembers. "I was out building boats or sailing them, even as a boy." Boatbuilding actually introduced Neil to woodturning. When he turned all the belaying pins for one of his sailboats, he planted the seed that would sprout years later. As it happened, it wasn't until about eight years ago that Neil seriously began turning.

SKILLS LEARNED IN PARADISE

A move made in 1981 for family health reasons took Neil and his wife, Ann, from the damp, cool Carmel climate to the big island of Hawaii. There, Neil finished his brother Brett's home, and he and Ann fell in love with the paradise: "We said, 'What the heck!' and decided to live there, too."

So, Neil built another home, where they resided for four years before returning to Carmel.

◀ **Named after photographer Edward Weston, Carmel's Weston Beach backdrops Neil and his turnings.**

Neil Weston

Creativity just comes naturally to 70-year-old Neil Weston. His father, photographer Edward Weston, was at the forefront of the art world in the 1930s. Neil's brothers, Brett and Cole, took up the camera, too, and now have worldwide reputations. Neil's creativity, however, flowed from his hands through wood—first into sailboats he designed and built, then into housing. Now, at an age when most folks settle down to good books and golf at Pebble Beach, Neil pours himself and his talent into turning wood in a big way.

At his secluded Carmel, California, home Neil turns huge bowls from native stock. He stalks wood along the rugged coast and in the nearby hills, saws it up, and turns it green on one of the most unusual lathes we have ever seen. Neil says he still has a lot to learn, but what he shared impressed us.

When they did, Neil carried a serious bite by the turning bug back to California.

"In Hawaii, I had watched a professional turner a few times and became fascinated. That was enough to make me want to get into it," Neil says. "But, I had to teach myself how to turn—and did—with the help of Dale Nish's books. I started with big bowls right off."

Neil makes no apologies for relying on a roundnose chisel for most of his finish-turning. "A shearing-type gouge is real tricky to use without any instruction, so I just got into scraping. I should use a shearing tool to smooth the wood more, but it's hard to teach an old dog new tricks," he says. "I do use a gouge, though, to rough out the bowl. When it gets down to the final finish, I find it more comfortable to scrape—with a light touch!"

In Hawaii, Neil learned more than how to use a lathe. He discovered how to buy wood for a pittance, turn it green, and dry it rough-turned.

Even now, past Hawaiian bargains represented by stacks of sealed, rough-turned bowls load up several shelves in his workshop. "That's *jenisero*," Neil explains. "It's a South American hardwood that naturalized in Hawaii. There, it grows into huge trees. I bought a whole pickup load of it from a wood wrecker—that's someone who removes trees—for $5 a chunk. What a deal that was! It's all dated 1982, when I rough-turned it. Because we lived in a desert area, I painted the bowls with latex paint to slow down the drying time."

Continued

TURNINGS BY THE SEA

In addition to the jenisero, Neil brought back 200 rough-turned koa bowls and an entire koa log.

Now Neil focuses on local hardwoods. "Mark, my son, is in tree removal," Neil explains. "He's alerted others in the wood-removal business here to keep their eyes open for trees that would make likely turning prospects for me, such as large-diameter, solid wood."

MYRTLE, REDWOOD, AND ROQUEFORT CHEESE

Neil focuses on acacia, alder, bay laurel (myrtle), English and black walnut, and redwood. Plus, he trades some wood with other turners around the country.

Frequently, Neil goes right to a job site where his son has dropped a tree for a firsthand look at the wood. If he salvages it, the log ends up next to his workshop. "The sooner you can get a chunk of the tree on the lathe after it's cut down, the better," Neil says. "Otherwise, it starts to shrink as it dries out. But, I can't always do that. To protect the log—to keep it from cracking, checking, and drying—I put it in the shade, coat the ends with paint, and cover it with sheets of plywood until I can get to it. Never cover a log with clear plastic. It will burn out."

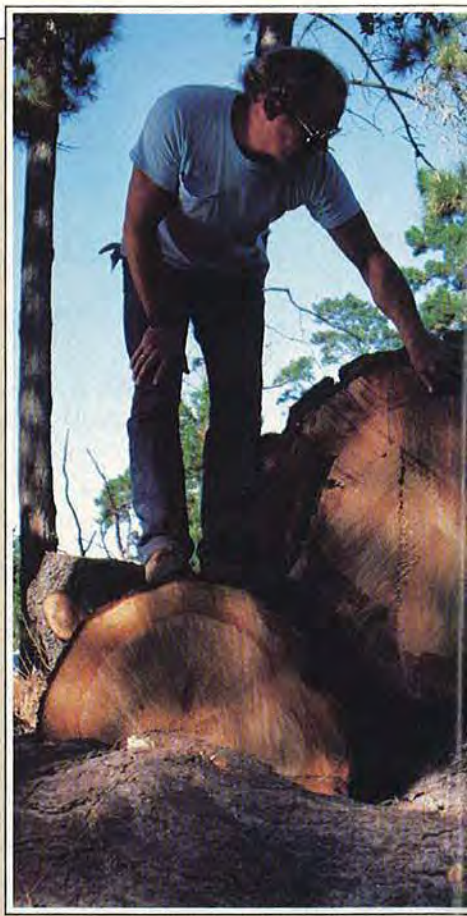
Local alder ranks among Neil's favorite turning woods. There's a handy supply, and he's learned to enhance the appearance. "I harvest alder in a canyon about six miles down the coast. And with some time and effort, I get it to spalt," he says. "It's like making Roquefort cheese."

Neil starts with a live tree ("I've found that a dead tree won't spalt") that he drops and cuts into logs 3′ to 4′ long. Instead of sealing the ends, he leaves them open so plenty of moisture enters the wood. "The fungus gets in, too, and it starts to go! I even take shavings from pieces of spalted wood and sprinkle them on the logs. It's like infecting them," he says. "I set the logs on the north side of my shop, spray water on them occasionally to keep them relatively green, and in six months to a year, I've got spalted alder."

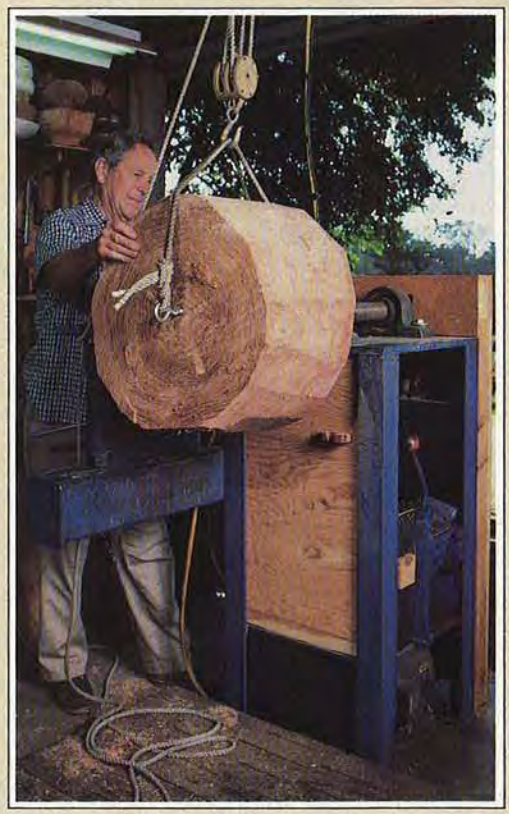
MEET J. B. HUMONGOUS

When Neil got serious about bowl turning, he went at it in a big way. His outboard lathe, named "J. B. Humongous" after its builder, Jerry Blanchard, and its size, has an 8′ swing with the toolrest removed.

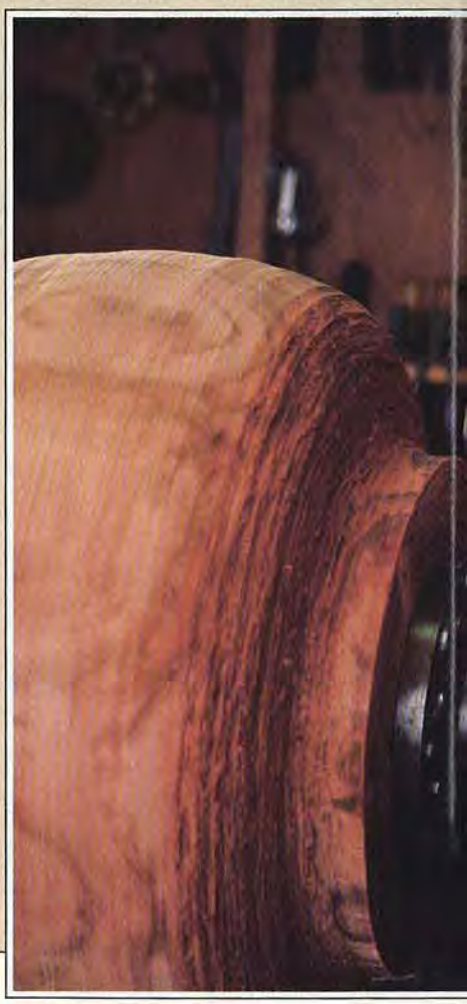
Powered by a 2-hp., 220-volt motor meshed with two side-by-side automotive transmissions, Humongous provides Neil with 13 speeds from 33 rpm to 856 rpm, plus a slow speed—actually a reverse—for final sanding. It's bolted to the concrete floor for less vibration, and

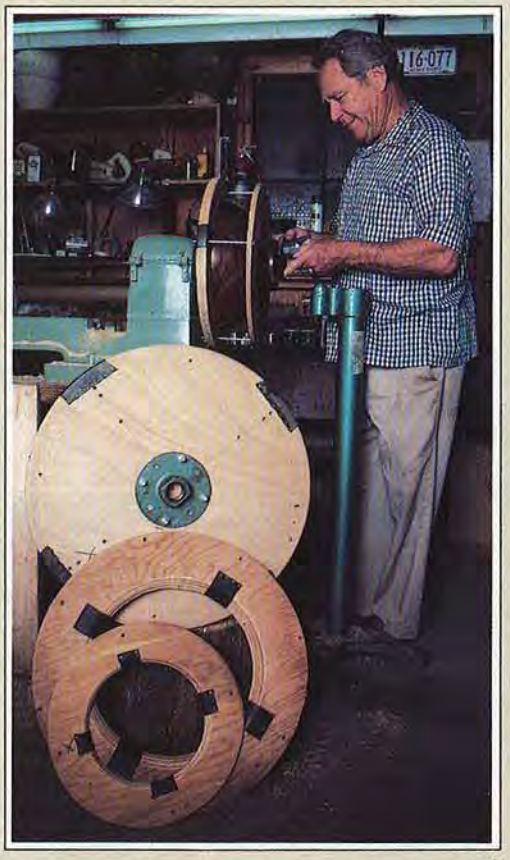


Neil and his son, Mark, check out ▶ downed redwood logs that could end up as bowls in a gallery.



▲ A block and tackle is a standard tool when 150-pound bowl blanks aren't uncommon around the shop.





▲ **A base and collet of plywood hold the inverted, finished bowl for the final turning of the recessed, lip-shaped bowl base that marks Neil's work.**

◀ **The lathe's 8′ swing hasn't been tested as yet, but Neil has turned bowls 28″ in diameter. He can choose from 13 forward speeds and a reverse.**

angled so that a fan blows turning dust right out the door.

"That lathe can swing really big stuff because it's built sturdy and geared low enough to handle it, but so far I've only turned a bowl about 28″ in diameter," Neil points out. "That chunk of wood, though, weighed 500 pounds, and I had to use a block and tackle to hoist it up and get it mounted."

Once Neil mounts a block on his Humongous, he turns it down to a wall thickness of ½″ to 1½″, depending on the size of the bowl. Then, he sets it aside to dry for six months or so after marking its rough-turned circumference. The notation helps him keep track of different woods' stability. Depending on the species, some wood will dry out of round by as much as ¼″, others only 1/16″.

THE FINAL FINISH

After final shaping of the bowl some six months later, Neil sands the work while it's still mounted to the faceplate. Next, he applies a slow-dry epoxy. After curing overnight, the bowl can be rubbed with 0000 steel wool to remove the high gloss. A buffing with flannel readies the work for the last bit of turning to craft the bottom rim. Neil likes to think of the distinctive addition as his personal signature.

"I read an article about how this turner shaped the bottom of his bowls," explains Neil. "It fired me up to try something like it myself." Neil tried, then perfected, the technique that gives his bowls a double-duty, liplike base. Creating the base rids the bottom of the faceplate screw holes, and attractively raises the bowl from any display surface. "If you finish the rest of the bowl first," Neil adds, "all you have to do is turn the bottom, finish that part, and you're done. It's great!"

Neil turns the base of the unfinished bowl with the help of a two-piece jig, photo *above*. He first chucks the 1½″ thick, circular plywood mounting plate (one of three in various diameters for diffferent-size bowls) into the headstock. Then, Neil centers the bowl, base out, on the plate and fits it with a collet of ¾″ plywood.

To make sure he doesn't burst through the bowl bottom with his turning tool, Neil notes the bowl's inside depth so he knows exactly how deep to shape the recess in the base. After shaping the recess and base lip, and some sanding, Neil finishes the bottom to match.

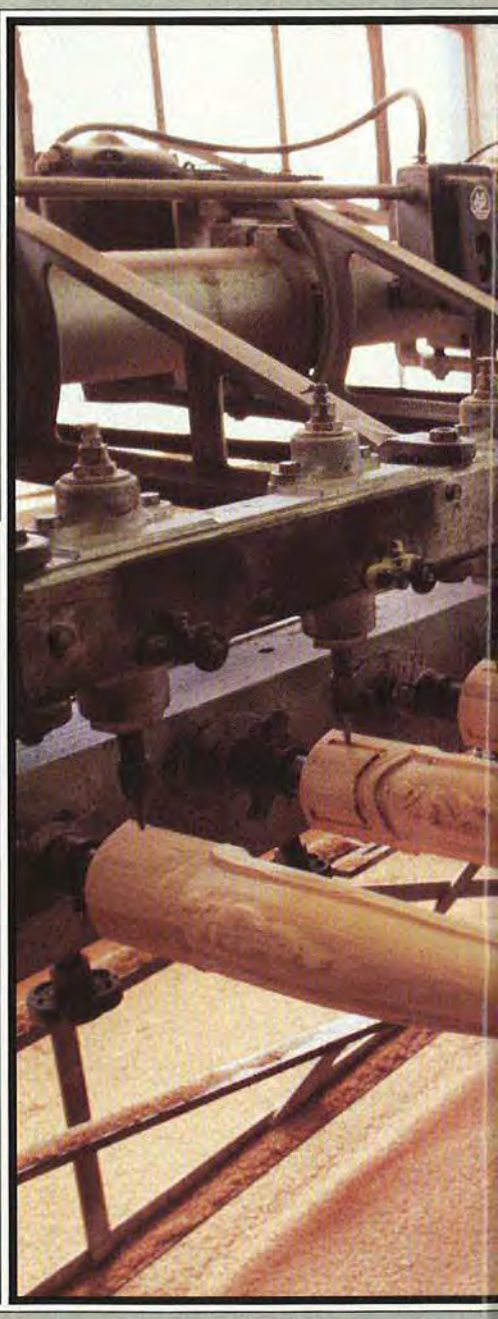
For a final touch, Neil glues a personalized silver medallion to the base of his bowls. The motif reflects his past and present—a ship's anchor encircled by the words "Weston, Hawaii and Carmel."

Written by Peter J. Stephano
Photographs: Jim Elder

Print this article

CRAFTSMANSHIP BY THE CARLOAD

THOMASVILLE INDUSTRIES TURNS OUT $1 MILLION IN HIGH-QUALITY FURNITURE EVERY DAY



In the town square at Thomasville, North Carolina stands a 30'-high Duncan Phyfe-style chair. In bustling Thomasville, chairs are big. So are tables, bedroom sets, china hutches, and other distinctive furniture pieces. Every working day, more than $1 million worth of furniture rolls off the assembly lines of Thomasville Furniture Industries.

What do a modern-day furniture plant and a home woodworker's shop have in common? Recently we visited Thomasville for a couple of days to find out.

We discovered that Thomasville's plants aren't as highly automated as we expected. There are conveyor belts and mega-machines, to be sure, but here, crafting furniture—from grading veneers to rubbing out remains a hands-on operation. The company's 6,000-plus employees take pride in a tradition of craftsmanship that goes back to 1904 when the original Thomasville Chair Company was founded.

FURNITURE IS FASHION

One reason why Thomasville has no intention of turning its plants over to robots and computers lies with the volatile furniture industry. For a week each spring and fall, retailers flock to Thomasville and nearby High Point to check out the latest styles and place orders for the furniture you'll eventually see in stores. One season Queen Anne might be a hot seller; buyers could bet heavily on country contemporary six months later. "Ours is very much a fashion-oriented business," observes Thomasville president Frederick B. Starr. "To keep up with changes in home fashion, we introduce about 100 pieces each year, and then adjust production as orders come in."

Far left: **A Thomasville Furniture craftsman carefully carves a new chair-leg pattern from mahogany stock. When the pattern meets approval, a metal cast will be made for the factory.**

Left: **The routers on this machine simultaneously duplicate 24 table legs.**

A new line of furniture begins in the design department with thumbnail sketches, renderings, and working drawings. Finally, Thomasville craftsmen handcraft a prototype. At this point, the piece is one of a kind, much like a project from any woodworker's shop.

But from then on, the prototype runs a gauntlet no amateur design has to endure. First, it goes to product engineering, where costs, dimensions, and joinery are carefully analyzed. Next, the prototype moves to a tough workout in the Physical and Chemical Testing Laboratory. One machine simulates a 200-pound man rocking the piece 10,000 times to ensure sound joinery. Another machine subjects the prototype to extremes of temperature and humidity.

Finally, after a new design passes all its tests, it's assigned to one of Thomasville's 11 production plants sprinkled throughout hilly northern North Carolina and southern Virginia. Ten additional service plants feed the production plants with lumber, veneer, carvings, and other components.

As you might imagine, 11 production plants create a tremendous appetite for materials. Thomasville devours about a million board feet of lumber and 2.5 million feet of veneer each week.

PEOPLE POWER

In 1987, Thomasville invested more than $10 million in new equipment. The materials budget—primarily veneer and hardwood—soars even higher. The annual sandpaper budget alone adds up to a whopping $2.5 million. But materials and machinery tell only part of the story. "Our greatest assets," says president Starr, "are our workers. People at Thomasville do their jobs right the first time."

Lots of men and women join the company just after completing high school and remain until they retire 45 or more years later. Why? Part of the answer lies with the quality of everyday life in North Carolina's hills and hollows. The winters are mild, the hunting good, and the fishing even better. With a job or jobs at Thomasville Furniture, a family can also farm a few acres and remain close to the land.

But on-the-job satisfaction means a lot, too, as any home woodworker could guess. At Thomasville the number of pieces produced are big, but workers know that their skilled craftsmanship still counts more.

CARVINGS BEGIN WITH A MASTER CARVER

We've often wondered how chair or table legs can look so highly detailed, yet each matches perfectly with its mate. We found the answer to this question in Thomasville's Service Plant E. This plant supplies millions of carved bedposts, table and chair legs, headboards and more to the production plants. Here, one of the master carvers—who has been carving since he was four years old—painstakingly handtools a mahogany bedpost that will serve as a pattern for multiple-spindle carving machines similar to the one shown *above*. In the factory,

At his bench, a Thomasville master carver adds detail to a bed post.

routers arranged in pantograph-fashion can simultaneously carve 24 table legs, for example.

VENEER BY THE MILE

Veneer salesmen, familiar faces among the area furniture companies, travel the highways pulling trailers of veneer samples behind their cars. On the day we visited, a salesman laid out a forest of samples—one veneered log at a time—for Thomasville buyers at plant V. In less than an hour, the buyers purchased dozens of trees after examining three veneer samples from each log—a slice from the top of the log, one from the middle, and another from the bottom. Later, the salesman packed up the rejects to peddle to other furniture factories.

Thomasville primarily purchases 1/28"-thick sliced veneer. Other species include pecan, hickory, cherry, oak, Carpathian elm burl, and olive ash burl. Workers processed more than 100 million surface feet of veneer last year.

To maintain an 8–10 percent moisture content, veneer flitches, as the sliced logs are called, go into storage areas where the temperature remains between 72 and 78 degrees Fahrenheit and the relative humidity at 35 percent.

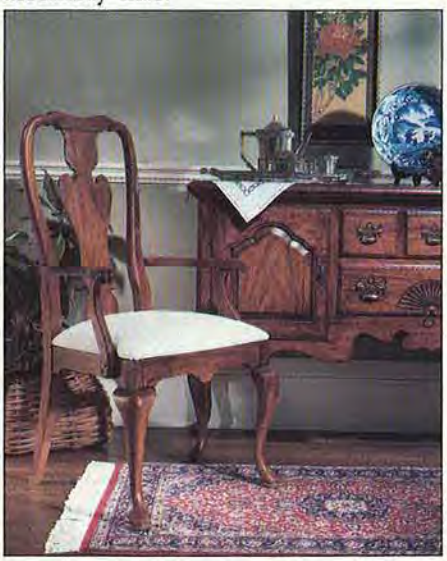
Workers with trained eyes and skilled hands then match the flitches and pressure-tape them together into panels used to surface table tops, cabinets, headboards, and other case goods.

How do a furniture- and your home- production shop compare? Plenty of ways. Both place a premium on the quality of the finished product. And neither shop would undertake a shortcut that could lead to anything less than the finest possible piece of furniture.

Assembling an intricate veneer pattern can require up to 80 separate steps.

THE BIRTH OF

Plant C, Thomasville's largest facility, produces more than 800 chairs during every eight-hour shift. To show you how they do it, we followed a Queene Anne chair, *below,* along the assembly line.



Doweling takes a two-step operation. One machine drills the holes, and another, shown *below,* injects glue into the holes and drives the dowels. The doweling occurs almost as fast as the operator can position the pieces. Later, these pieces will tie together the back posts at seat level.

A CHAIR IN CHAIR CITY

Our chair begins at a series of band saws, where workers cut some of its various components from rough stock. Here, Angela Miller saws chair back posts on a machine that has a 48-inch throat. A pattern jig ensures that each piece will be identical.

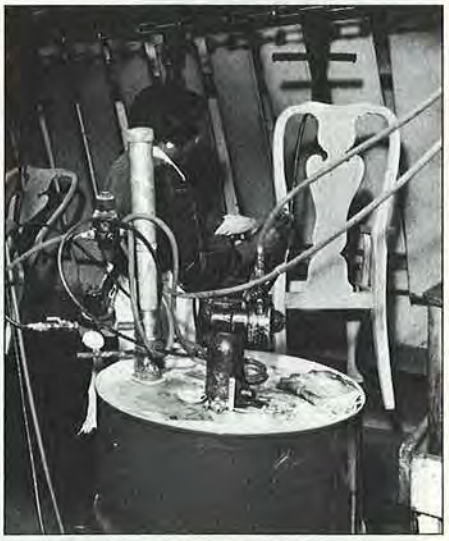
Pecan chair legs, enough to seat a state dinner, roll down the production line to a team of workers who form round-overs on a double-spindle shaper. After shaping the leg, the parts are stacked onto a cart and wheeled to the sanding area.

Now, the chair-back posts get a good sanding. This brush sander uses 120-grit ¼"-thick scored cloth sandpaper. Fingerless gloves and fingertip caps protect workers' hands and still allow the operators to get a good feel for the job they're doing.

Finally, our chair begins to look like a Queen Anne chair. One worker hand-assembles the back components, which will then be clamped in the machine to her right. Workers in the background immediately scrape off the excess glue, and apply filler where necessary to the joints.

More hand assembly completes the Thomasville chair frame. This pneumatically powered machine can clamp 100 chairs an hour. After assembling each frame, the chair gets a ride on an overhead conveyer until the glue dries. Then, an inspector rigorously tests all the chair joints.

To ensure a uniformally colored chair, workers carefully match wood tones of all Thomasville furniture. First, an equalizing stain lightens the dark wood. Next, a sap stain darkens the light wood. After workers spray on a final stain coat, they seal the chairs with lacquer.



Written by Jim Hufnagel with Marlen Kemmet; photographs by Richard Hagerty

PICTURE THIS

YOU CAN FRAME LIKE A PRO

Print this article

It's one thing to be able to accurately cut and join four pieces of wood into an attractive-looking frame. But preparing artwork for framing (and for posterity)—now that's another story. Read on and you'll learn the ins and outs of how to correctly mount photos, posters, needlework, and other types of artwork. It's not nearly as difficult as you might have imagined, and surprisingly, requires only a small investment in equipment.

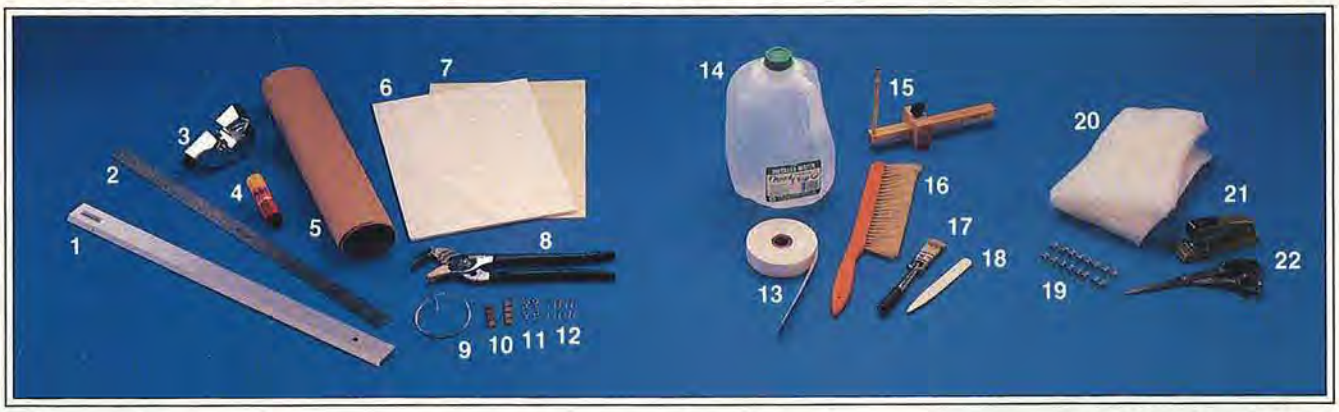
We don't have any resident framing experts on the *WOOD*® magazine staff, so for this article, we turned to a couple of professional framers for a helping hand.

Marlene Olson, owner of Olson-Larsen Galleries in Des Moines, has done framing for museums and individuals for more than nine years. She has a genuine interest in spreading the word about good framing procedure because, she says, "A lot of the pieces that come into our gallery for framing have beeen damaged by improper mounting."

Glenda Shaw, our other consultant, has framed hundreds of needlework projects for Dot's Frame Shop, also in Des Moines.

We spent some time watching these two ladies perform their feats—asking questions all the while—and we now have a better handle on this subject ourselves. First we'll go through mounting works of art on paper, then we'll show you how to mount needlework. Professional framers mount artwork first, then fit a frame to the mounted piece, so we'll look at frame dimensions last (see page 47).

HERE'S WHAT YOU'LL NEED



THE BASICS

No matter what your skill level, or the type of mounting project, you'll need these tools to do the job correctly: (1) metal straightedge with nonskid backing for guiding a mat cutter; (2) ruler; (3) mat cutter for making beveled and straight cuts; (4) glue stick for attaching the frame's dust cover; (5) kraft paper for a dust cover; (6) ¼" foam-core stock for making a rigid backing board; (7) rag board (acid-free mounting board) to make a mat and form an acid barrier; (8) adjustable-jaw pliers for squeezing brads into the frame; (9) picture-hanging wire; (10) rubber bumpers for cushion between the frame and wall; (11) ¼" screw eyes (¾" long) for fastening the picture-hanging wire to the frame; and (12) ⅝"×#18 brads for securing the picture package in the frame.

ARTWORK EXTRAS

If you're working on a poster, photo, or other art on paper, you'll need: (13) linen tape for fastening the art, mat, and mounting boards together; (14) distilled water for wetting the linen tape; (15) marking gauge and pencil for drawing cutting lines; (16) dusting brush for keeping the workpiece clean; (17) 1" brush for applying distilled water; and (18) burnishing bone for smoothing beveled edges.

NEEDLEPOINT EXTRAS

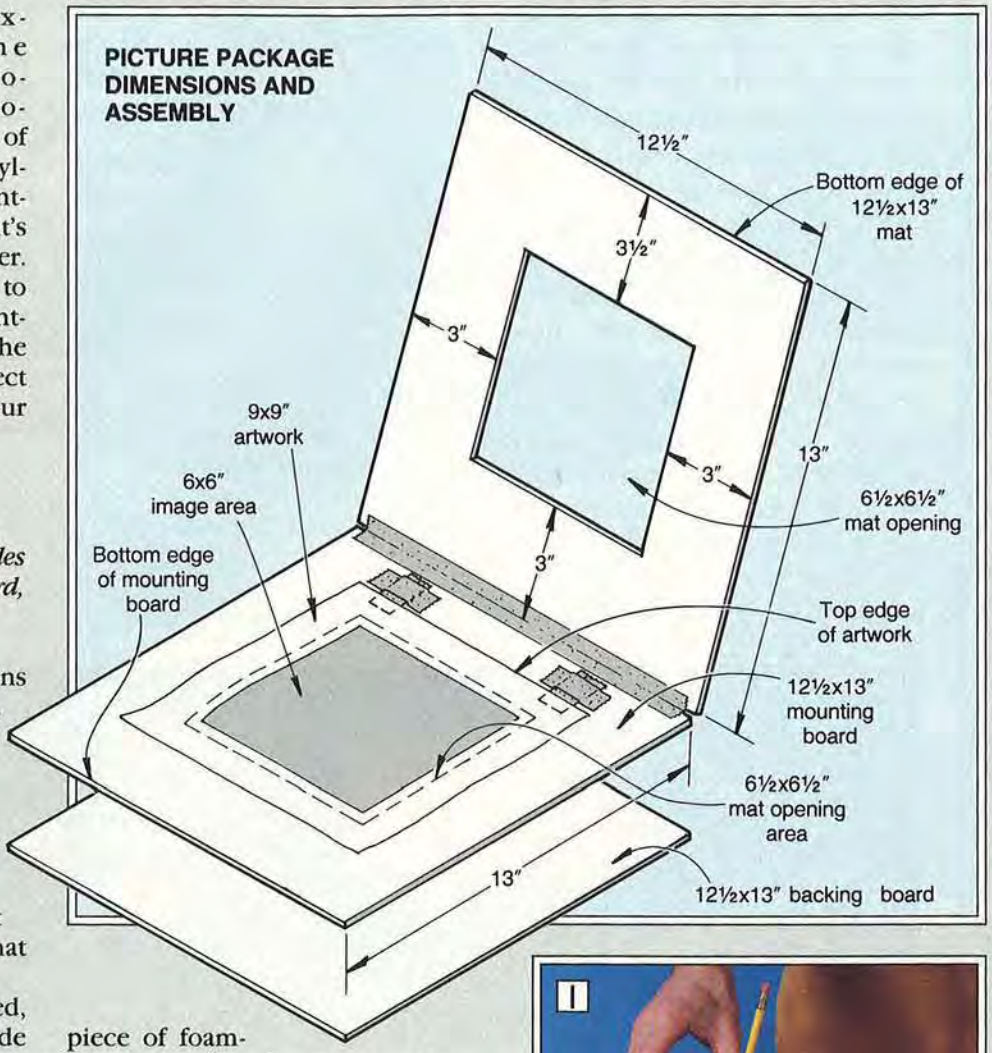
And for needlework, get hold of (19) pushpins to stretch and temporarily attach the needlework to the backing board; (20) quilt batting to back the needlework and give it a three-dimensional look; (21) stapler for attaching the needlework; and (22) scissors for cutting the quilt batting.

You may already have many of these supplies. The mat cutter we use costs about $15; a small roll of linen tape, about $4. See the Buying Guide on page 47.

Continued

HOW TO MOUNT PHOTOS, POSTERS, AND

To help in explaining the mounting process for all so-called works of art on paper, we selected the acrylic painting shown here. The painted area measures 6×6", and it's centered on a 9×9" piece of paper. The sizes we refer to from time to time apply to this particular painting, but the process will be the same no matter what paper project you're working on—just use your own dimensions.



SIZING THE PICTURE PACKAGE

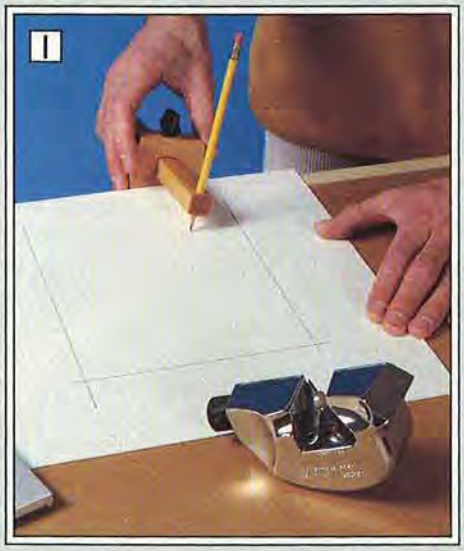
*(**Note:** The picture package includes a backing board, mounting board, artwork, and mat board.)*

Start by measuring the dimensions of the image area of your project. As stated above, ours measures 6×6". And since we wanted to include the artist's signature, we left a ¼" border around the painted area. As you can see by studying the illustration at *right,* this means that we will need to cut a 6½×6½" mat opening to frame our painting.

With this one dimension fixed, you now can determine the outside dimensions of the mat, mounting board, and backing board. Follow Marlene's advice and figure on a 3" border at the top and sides of the mat opening and 3½" at the bottom. "A 3" border is pretty standard, that is unless you're dealing with art that's either very small or very large. Make the bottom border 3½" to prevent the artwork from sinking," Olson advises. "Sinking" refers to the illusion of matted artwork appearing lower in a frame than it actually is.

Next, transfer these outside measurements to two pieces of rag board (one each for the mounting board and the mat board) and one piece of foam-core stock (for the backing board). Using a mat cutter set for a straight (not beveled) cut, and a straightedge, cut all three boards to size.

And finally, to prepare the mat opening for cutting, lay the mat board front side down on a clean work surface. Then, set your marking gauge and outline the opening with faint pencil marks, as shown in photo 1.



▲ A marking gauge helps pencil the mat opening (for photo purposes, we darkened the lines—faint lines work best).

HOW TO CUT THE MAT OPENING

Learning to use a mat cutter takes a little time, so start by reading the instructions that come with the

OTHER ARTWORK

tool. Then, make several practice cuts on scrap mat stock.

Now, with your thumb and the point of the blade facing the outside of the mat (see photo 2), begin the cut about ⅛" beyond the end of the intersecting lines. (Starting the angled blade beyond the corner on the back side of the mat makes the cut complete on the face side.) Next, line up your straightedge so the mat cutter follows the penciled line, and push the cutter ⅛" beyond the next intersecting line. Rotate the mat board 90° counterclockwise, and repeat until you've cut all four sides.

After cutting, erase the pencil lines. Otherwise, they could transfer to the artwork.

POSITIONING AND SECURING THE ART

To "hinge" the mat board to the mounting board, lay both boards down (mat board front side down, mounting board front side up), with their top edges touching and flush at the ends. Then, cut a piece of linen tape about the width of the boards, wet its gummed surface with distilled water, and center the tape on the joint.

Now, lay your artwork in the center of the mounting board, and hold the mat just above the artwork with one hand. With your other hand, position the art so the desired image shows through the mat opening. Open and close the mat until you're satisfied with the positioning. Then, place a protective scrap piece of rag board on the image, and place a weight on the scrap to hold the image in position.

To attach the artwork to the mounting board, follow the process in the illustration at *left*. Wet the tape lightly—don't soak it.

If you have a glass-cutting tool, cut a piece of single-strength glass to the same dimensions as the backing board. Or, have the people at your local hardware store or glass shop cut the glass for you. Clean the glass with a mild water-vinegar solution.

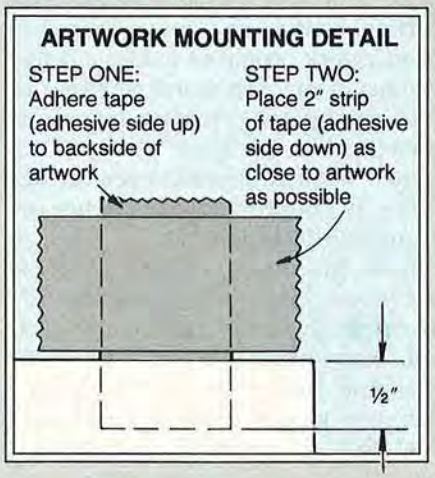
Assemble the picture package by laying down the backing board and stacking on the mat assembly next. At this point, check the overall appearance of the mat. Brush away any dust or lint on the mat, then lay the glass on top. Place the frame over the package as shown in photo 3 at *left*.

Slide the package halfway over the work surface edge, hold the package together, and turn it over. To secure the package, squeeze brads in with an adjustable pliers, spacing them 3" apart and coming within 1" of the corners (see photo 4 for how to do this). Be careful not to drive the brads completely through the frame.

To make the dustcover, professional framers use brown kraft paper (grocery-bag-type paper), but any sheet of strong paper will work. Run a glue stick along the back edge of the frame, and apply the dustcover as shown in photo 5.

▲ With the straightedge held down firmly, push the mat cutter alongside it to cut the mat opening.

▲ Place the frame over the picture package as shown. Now, check for any lint or dust trapped under the glass.


ARTWORK MOUNTING DETAIL
STEP ONE:
Adhere tape (adhesive side up) to backside of artwork
STEP TWO:
Place 2" strip of tape (adhesive side down) as close to artwork as possible
½"

▲ Apply an oversized dustcover to the frame's back, and trim to size with a razor blade or an X-acto knife.

◀ An adjustable pliers with its jaw padded with masking tape makes a great brad driver.

Continued

MOUNTING NEEDLEWORK:
A FEW POINTERS

Needlework projects present a different set of challenges to novice and professional framers alike. Glenda Shaw, our needlework consultant, said, "About 90 percent of the needlework I do is mounted with a quilt batting." Although some people mount needlework flat, we'll go through the more-popular method.

PREPARING THE NEEDLEWORK PACKAGE

The section-view shown *below* depicts the parts of the needlework package. Note that you have a foam-core backing board topped by a mounting board, with a layer of quilt batting on top of that. The needlework rests on this cushion and attaches to the backing board. The batting serves two purposes. It gives the needlework a three-dimensional look and also helps disguise any lumps from large stitchery knots.

Once you have completed your needlework project, measure the dimensions of the image area, and decide how far you want its borders to be from the frame. You'll need at least 1" of fabric to wrap around the backing board and to attach the project.

Because this process doesn't require matting, cut the backing and mounting boards to the same size as the image area. See page 44 to find out how we cut these boards.

Use a glue stick to attach the white mounting board to the foam-core backing board. Avoid using colored rag board that may reflect through the batting and the needlework. In addition, mounting board blocks acid; see the tip on page 47 about the importance of blocking the travel of acid.

Now, cut a piece of quilt batting (available from fabric stores) to a size slightly larger than the two boards you just cut, and attach it to the mounting board with a glue stick. With scissors, cut a beveled 45° edge around the batting. The bevel allows the needlework piece to smoothly taper into the frame.

STRETCHING THE NEEDLEWORK

Lay down the assembled package, batting facing up, and center the needlework on top of it. Use a ruler to check for even borders. Place a few pushpins into the backing board's corners (see photo 1 at *right*). You can precisely center the piece by counting fabric stitches or "squares," if desired.

Now, place pins into the edges of the foam-core board about ½" apart, gently stretching the fabric as you move around the piece in any direction (see photo 2). Don't distort the image by overstretching. Feel free to restretch the needlework during this stage; even pros remove and replace pins often.

SECURING THE NEEDLEWORK

Next, flip the needlework over and staple it to the backing board. As shown in photo 3, putting the staples in at an angle will provide greater hold. We chose ¼" staples because larger sizes may penetrate the needlework.

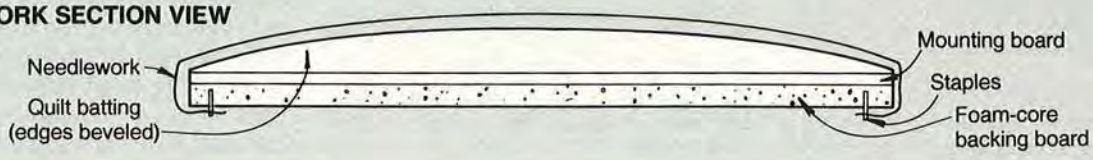
You can now remove the pushpins, place the package in its frame, and assemble as we did for the artwork package on page 45.

▲ **We readjusted our corner pushpins to precisely center the piece.**

▲ **You'll do most of the stretching as you pin the last two edges.**

▲ **During stapling, pull the corners tight. Otherwise, the needlework package may not fit into the frame.**

NEEDLEWORK SECTION VIEW

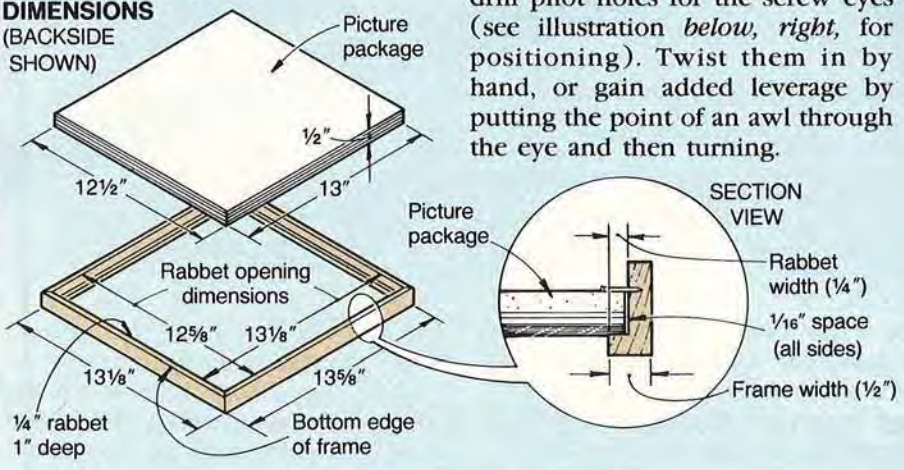


Produced with Marlene Olson and Glenda Shaw

FITTING AND HANGING THE FRAME

With the artwork package completed, now you finally can get to use your woodworking skills. To determine the amount of frame stock you'll need, and where to cut the miters, first figure the rabbet opening by adding ⅛" to each of the picture package dimensions (so the package fits comfortably). The drawing *below* shows this graphically. The 12½×13" picture package from our first example requires a 12⅝"×13⅛" opening.

FRAME AND RABBET DIMENSIONS
(BACKSIDE SHOWN)



Then, measure the width of your frame material less the rabbet (see section view *below*). In our case, this equals ¼" (½" – ¼"). Now, multiply that number times 2 (¼" × 2 = ½"). Add that amount to the rabbet opening dimensions—12⅝" + ½" = 13⅛" and 13⅛" + ½" = 13⅝"—to calculate the outside dimensions of your frame.

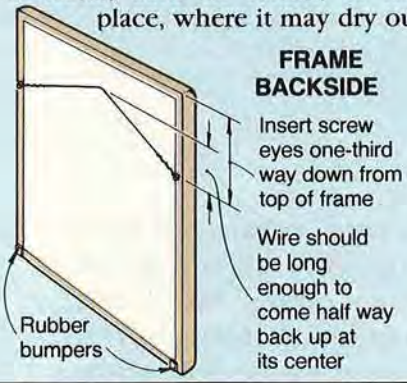
PUTTING YOUR PROJECT ON THE WALL

With the frame package together, drill pilot holes for the screw eyes (see illustration *below, right,* for positioning). Twist them in by hand, or gain added leverage by putting the point of an awl through the eye and then turning.

Fasten the hanging wire by looping it twice through the eyes, then twisting it back around itself. Wrap the loose wire ends with masking tape. Attach self-adhesive rubber bumpers to the bottom of the frame. Finally, use picture-hanging hooks rated for the weight of your frame to secure it to a wall.

Your tastes dictate where to you hang pictures, but follow these tips:

- Don't let direct sunlight hit the frame. Strong light fades pigments in the artwork and mat boards, and may even cause condensation on the inside glass surface.
- Avoid placing the artwork above a heater, cold air return, or fireplace, where it may dry out.


FRAME BACKSIDE
Insert screw eyes one-third way down from top of frame
Wire should be long enough to come half way back up at its center
Rubber bumpers

TIPS FROM OUR FRAMING EXPERTS

1 WORK CLEAN

Place a cardboard sheet over your work surface to keep it clear of anything that could soil or scratch your workpiece. The cardboard also will prevent your mat cutter from slicing into the workbench. Wash your hands to keep skin oil off the artwork and mat.

2 USE A THICK STRAIGHTEDGE

Mat cutters can jump over a yardstick or similar thin edge (less than ¼" thick), possibly causing injury. The straightedge should have a nonskid backing. If you have difficulty keeping the straightedge in position during long cuts, clamp it to the work surface.

3 ACCEPT NOTHING LESS THAN ACID-FREE

You may have never heard of acid-free rag board, but any framer worth his or her salt uses only acid-free materials for anything in contact with artwork. If given the chance, acid will contaminate adjoining materials, causing weakening and discoloration of fibers. Cardboard and kraft paper contain high amounts of acids, but can be used in the mounting process if separated from the artwork by an acid-free barrier, such as rag board.

You can purchase white acid-free rag board from most art stores. Buy multicolored acid-free rag board and linen tape from the Buying Guide source at *right.*

4 GIVE THE ARTWORK SOME SPACE

Like you, artwork needs space. Never place it directly against glass; doing so will promote mildew growth. Beyond aesthetic reasons, a mat serves as a spacer between the artwork and glass. If you don't use a mat, hide a ⅛"-thick spacer behind the rabbet and between the artwork and glass.

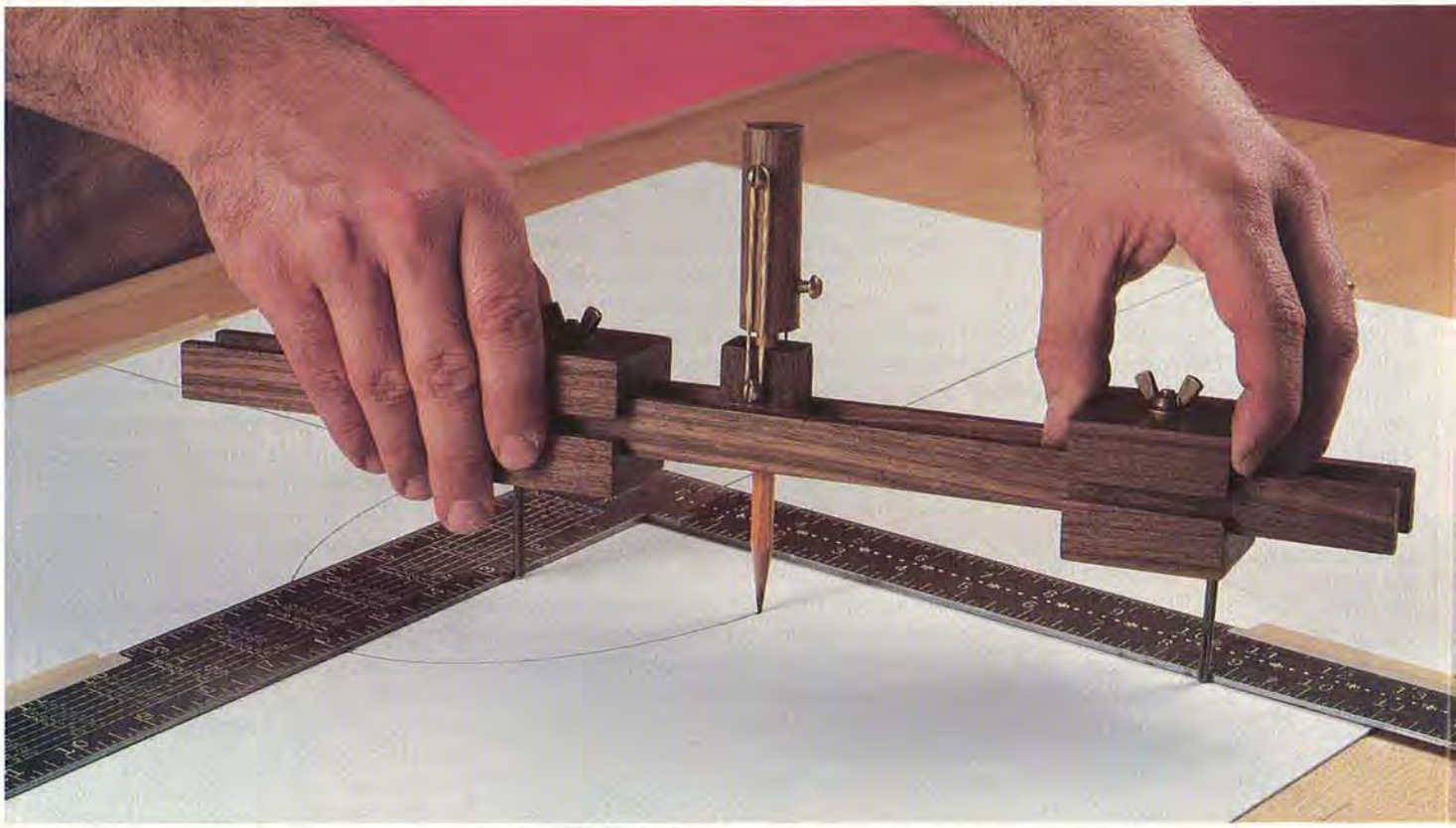
BUYING GUIDE

For a complete catalog of framing supplies, including all the materials used in this article, contact:

Light Impressions
439 Monroe Avenue
Rochester, NY 14607-3717
716/271-8990

Written by Bill Krier — Photographs: Hopkins Associates; Bob Calmer — Illustrations: Bill Zaun; Advertising Art Studios, Inc.

HOMEMADE OVAL MARKER



When Don Polson of Albia, Iowa, stopped by the *WOOD* magazine offices for a tour not long ago, he brought with him one of his favorite homemade tools—an oval marker. Don uses the device for marking mat board and laying out picture frames with oval cutouts. We think you'll enjoy giving Don's ingenious tool a workout in your own shop.

Note: For more information about picture framing, see our techniques article beginning on page 42.

FORM THE SLIDING BLOCKS

1 Cut a piece of ¾"-thick walnut to 1¾" wide by 10" long. Later, you'll crosscut the strip into four sections for the sliding blocks (A).

2 Mark the groove locations on one end of the walnut strip where shown on the Sliding Block Drawing. Cut or rout a pair of ¼" grooves ¼" deep along the bottom face of the strip. (We cut ours on the table saw using a dado blade.)

3 Crosscut four pieces, each 2" long, from the 10" strip. Using the dimensions on the Sliding Block Drawing, mark the center points, and drill holes in each block.

NOW, CUT THE REST OF THE PIECES

1 Cut a piece of ¾"-thick walnut to 2×16". Position the rip fence 7/32" away from the inside edge of the table saw blade, and rip a beam (B) to 7/32" wide. Check that the beam slides easily in the ¼" grooves in the sliding block; reset the saw fence if necessary. Then, cut the second beam to width.

2 Cut the pencil holder (C) to size. Mark the center point on the top end, and drill a 5/16" hole through the piece. Now, mark the locations, and drill the 5/32" holes for the pair of roundhead machine screws.

3 Cut a piece of ¾" dowel 2½" long for the pencil tensioner (D).

4 Clamp a long piece of scrap stock to your drill press table, and drill a ¾" hole ½" deep into it. Switch to a 5/16" bit, and stick the 2½"-long dowel in the hole in the scrap. Holding the dowel with a small handscrew clamp, drill a 5/16" hole centered and through the dowel.

5 Hold the pencil tensioner (D) in a handscrew clamp, and then drill the 5/32" holes where shown on the Exploded-View Drawing.

6 Sand all the walnut pieces.

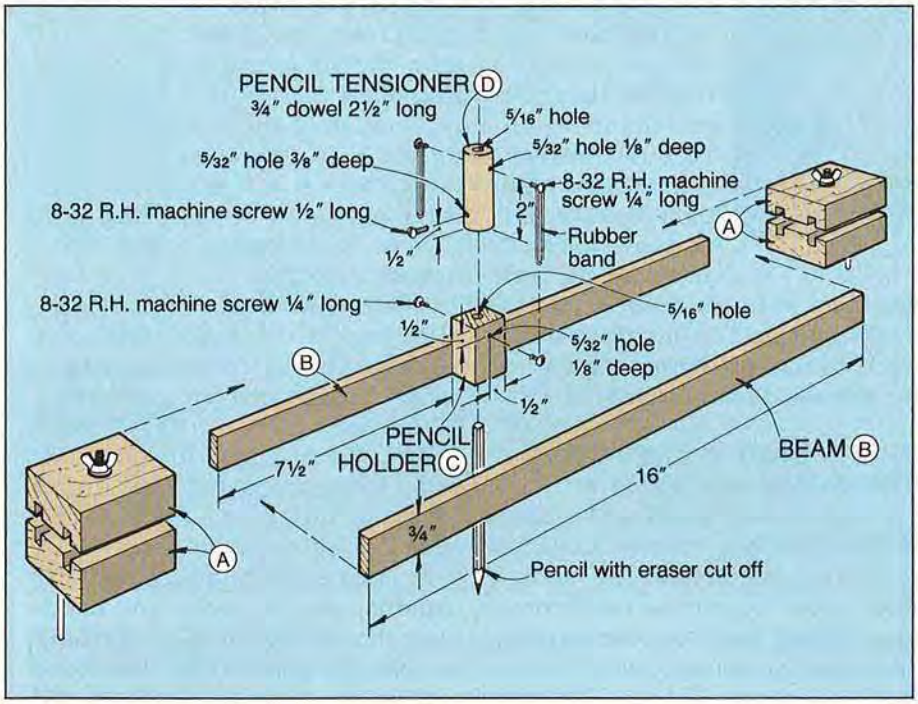
7 Cut off the heads of two #8 common nails, so the nails are the same length. Sand a round-over on each clipped end. With the rounded end protruding, epoxy one nail into each block (see the Sliding Block Drawing for reference). The length of the nail protruding from each block should be equal.

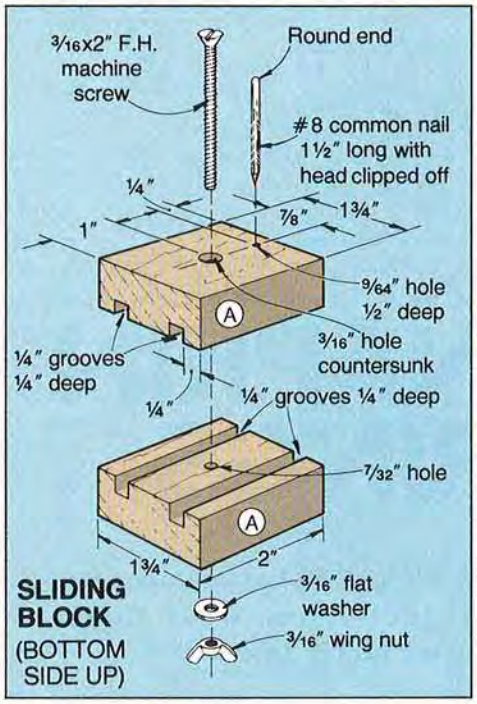
ASSEMBLE THE MARKER

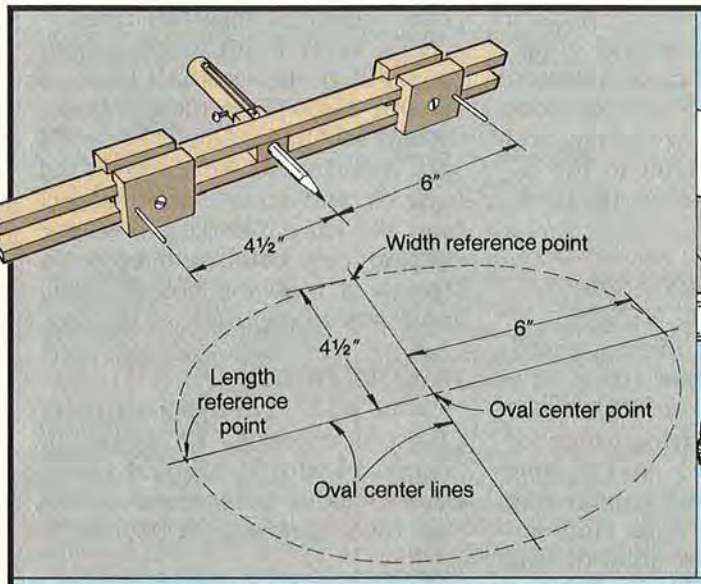
1 Join two of the sliding block parts (A) with a 3/16×2" flathead brass machine screw, flat washer, and wing nut. Repeat for the second sliding-block assembly. Position a sliding block on each end of the pair of beams.

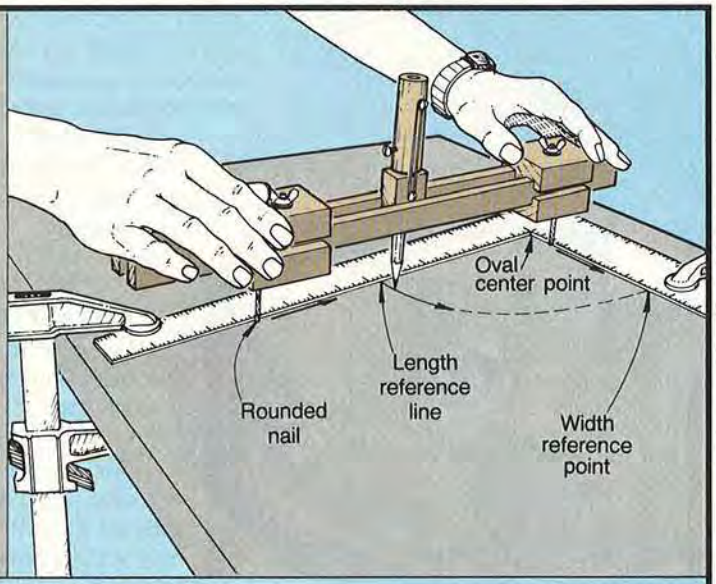
2 With the bottom edges of the beams and holder flush, glue and

A SIMPLE TOOL THAT SIMPLIFIES A DIFFICULT TASK









HOW TO USE THIS HANDY TOOL

STEP 1. *Mark the center of the stock, and draw perpendicular axis lines through the center. Measure and mark reference points on the axis lines for the oval length and width. Our oval measures 9 × 12", so we made our marks 4½" and 6" from the center. Position the sliding blocks so the distance from the pencil lead to the outside edge of the nails measures 4½" and 6" respectively. Tighten the wing nuts to hold the sliding blocks on the beams.*

STEP 2. *Align the inside edges of a framing square flush with the marked axis centerlines where shown above. Clamp the square in place. Position the oval marker where shown. Keeping the rounded nails firmly against the inside edges of the square, move the oval marker to form a quarter section of an oval. Reposition the square, clamp the square in place, and repeat the procedure three more times to complete the oval.*

clamp the holder, centered from end to end, between the beams.

3 Cut the eraser off a #2 lead pencil. Insert the pencil into the pencil tensioner. Then, insert the bottom end of the pencil through the pencil holder. Position the pencil so the sharpened end protrudes about ⅛" *lower* than the rounded ends of the nails. Tighten the pencil in place in the pencil tensioner with an 8-32 machine screw.

4 Finish; then fasten the screws to the pencil holder and tensioner. Attach the rubber bands.

Project Design: Don Polson
Photographs: Hopkins Associates
Illustrations: Kim Downing, Bill Zaun

EXOTIC WOOD NAPKIN RINGS

An intriguing between-centers project from West Coast turner Mitch Talcove.

Another in a collection of patterns from the nation's top woodturners.

Print this article

Mitch Talcove

Exotic hardwood from Latin America puts bread on the table for California lumber merchant Mitch Talcove. Mitch contracts for logs, harvested from Central America and Mexico, and cuts them in his sawmill in Puerto Vallarta, Mexico. In his spare time, Mitch thinks up creative ways to use valuable sawmill scraps.

FIRST, SHAPE A TAPERED, SOFTWOOD MANDREL

Cut a piece of softwood 1½" square by about 8" long for the mandrel. "A fir or pine 2×4 works well," Mitch notes. "A softwood will compress slightly and keep the napkin blank snugly attached when turning it to shape. Harder woods won't compress as well." Mark a center point on each end of the mandrel, and mount it between centers on the lathe. Turn the stock round with a ½" gouge, and taper the mandrel to the dimensions shown on the drawing *below*.

HERE'S HOW TO TURN THE RINGS

For ease in turning round, bevel-rip the edges of a 2×2×12" turning square (see the Buying Guide for our source) on the table saw. Cut the napkin ring blanks to 1¾" long. Find and mark the center point on one end of each blank. Using a drill press and a Forstner bit, bore a 1¼" hole through the center of each napkin blank.

Remove the tapered mandrel from the lathe, and slide a napkin ring blank onto it until it fits snugly. Now, twist the blank clockwise to lock it in place. Turn the blank round with a ½" gouge and form the slight tapers on each ring with a skew. Mitch prefers a wall thickness of about ⅛".

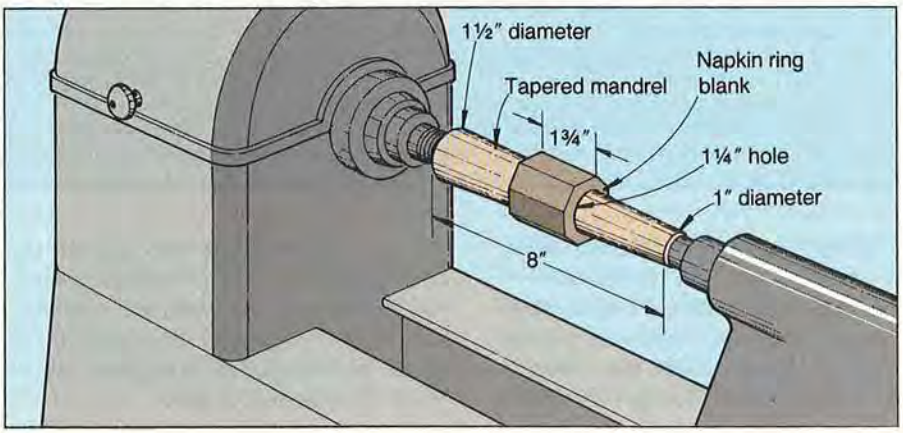
To sand the inside of each napkin ring, Mitch makes his own sanding drums. Here's how to do it: wrap double-faced tape around a ½"-diameter piece of dowel stock 3" long. Then, adhere 100-grit sandpaper to the tape, chuck the dowel into your drill press, and sand the inside of each napkin ring. Now, slide one napkin ring back onto the mandrel, start the lathe, and hand-sand the outside of it, progressing to 400-grit paper. Stop the lathe and do the final sanding with the grain. Repeat for the other rings.

Now, apply finish to the napkin rings. Mitch likes to finish his with Liberon Black Bison Clear Wax, although any high-content carnauba wax would work. Next, loosen the tailstock, and remove the mandrel from the lathe. Carefully twist the nakpkin ring counterclockwise to separate it from the holder. Then, apply wax to the inside of the ring.

BUYING GUIDE

• 2×2×12" Turning square. Choice of cocobolo, $5.75 ppd., or bocote, $4.90 ppd. Tropical Exotic Hardwoods of Latin America, P.O. Box 1806, Carlsbad, CA 92008.

Photographs: Hopkins Associates, David Schwefel
Illustration: Kim Downing, Bill Zaun



Issue 17
June 1987

Issue 18
August 1987

Issue 19
October 1987

Issue 20
December 1987

WOOD INDEX

Cumulative index for issues 17-24

If you save back issues of *WOOD*® magazine for future reference—as many of our readers do—save this index in a special spot. The index appears in the center of the magazine so you can remove it. We've tried to keep the index easy to use. For example, after the subject "Picture frame," you'll see the number 21:50-53. This means the article on pages 50 through 53 of issue 21. Because "Picture frame" happens to be a project, you also can find it listed in the "Project Index" on page 53.

The index for *WOOD* issues 1-8 appeared in issue 9 (February, 1986). The index for issues 9-16 appeared in issue 17 (June, 1987).

Issue 21
February 1988

Issue 22
April 1988

Issue 23
June 1988

Issue 24
August 1988

A-C

Abrasives, kinds of, **20:**50–53
Alder, red, **21:**33
Amana furniture, **19:**66–69
  finish for, **19:**70–71
Arts and crafts shows, **19:**42–43
Aspen, **18:**29
Axmaker, **19:**96–98
Balsa, **23:**83
Band saws:
  blade honing, **17:**16
  blade installation, **21:**18
  boxes made with, **21:**62–65
  extension table for, **18:**20
  slick work surface for, **22:**14
Belt buckles, **20:**80
Bench dogs, **19:**18
Bird feeder, **19:**74–75
Bits, **17:**26; **23:**26
  in drill press, **24:**31
  Forstner, **20:**95–96
  router, **17:**36
  tapering, **21:**16
Blacksmith, **19:**96–98
Blade-height gauge, **22:**58–59
Boat, model **18:**54–57
Bookcases:
  barrister's, **21:**66–71; **23:**10
  standards for, **21:**58–61
Books, woodworking, **20:**58–59
Bowls:
  blanks for, harvesting, **20:**44–49
  compote, **19:**56
  stave, **23:**30–39
Boxes:
  jewelry, **23:**53; **24:**48
  scallop, band-sawn, **21:**62–65
  toy, **18:**52
Brads, setting, **21:**18
Brushes, **23:**25
  foam, using parts of, **17:**19; **22:**14
Buckles, belt, **20:**80
Bulldozer, toy, **20:**78–79, 82
Burl-topped coffee table, **18:**40–44
Buymanship:
  abrasives, **20:**50–53
  carvers, power, rotary, **19:**64–65; attachments for, **19:**30
  combination woodworking machines, **22:**52–57
  dovetail jigs, **19:**34–39
  drill presses, **24:**56–61
  Forstner bits, **20:**95–96
  joiners, plate, **23:**44–47
  planers, power, hand-held, **18:**70–75
  routers, plunge, **21:**34–39
  safety glasses, **24:**64–67
  saw blades, circular, **20:**60–62
  saws, radial arm, **17:**42–47
Cabinets:
  corner, **23:**52
  file, **21:**72–75, 88; **22:**11
  insect control under, **20:**14
Candle holder, **20:**67
Caning chairs, **23:**48–49
Carving:
  with chain saw, **23:**40–43
  figures, human:
    French Louie, **17:**78
    Hillbilly Will, **24:**76–77
    Mrs. Todd, **19:**57
    proportion wheel for, **22:**22
  fish, **21:**76–79
  hand tools for, **20:**21; **24:**79
  horse, **23:**53
Carving *(Continued)*
  lacquer finish, **22:**48–51
  power tools for, rotary, **19:**64–65
    attachments for, **19:**30
  safety rules for, **20:**29, 31
  serving board, **22:**74
  workstand for, **22:**22
Carving board, **17:**40–41
Cedar, western red, **19:**33
Chain saws:
  carver using, **23:**40–43
  sharpening, **20:**99, 101–102
Chair rail (molding), 21:49
Chairs:
  director's, teak, **23:**65–69
  leg-rail joinery for, **18:**34–39
  members, repairing, **24:**16
  recaning, **23:**48–49
  rockers, **19:**40–43
Cheese board, art-deco, **24:**54
Chests:
  cedar, **24:**49
  tool, **19:**44–47
Children's items. *See also* Toys
  clothes rack, rabbit, **22:**67
  cradles, **19:**58–62; **20:**11; **23:**52, **24:**49
  dinosaur mirror, **19:**76–77
  play structure, **23:**72–76
  toy box, **18:**52
Chisels, **20:**26; **21:**24
Chucks:
  adapter rings for, **17:**24
  three-jawed, tightening, **22:**14
Clamps:
  blocks for, holding in place, **20:**16; **23:**14
  drill press as, **17:**16; **24:**30
  frame, making, **21:**16; **24:**18
  pipe, edge-joining with, **19:**85
  strap, **23:**24
Clocks:
  carved and sandblasted, **18:**53
  from kits, **19:**50–53
  mantel, **20:**54–57
  tall, contemporary, **22:**40–47, 78
  teddy bear, **22:**64–65
  turned teak, **19:**78–79
Clothes rack, rabbit, **22:**67
Clothing for woodworking, **20:**27
Collectible tools, **18:**50–51, 88
  levels, **19:**82
  shaves, **19:**100
Combination woodworking machines, **22:**52–57
Compass, yardstick, **23:**23
Contact cement, **18:**81
Corner-block leg-rail joinery, **18:**34–37
Cradles, **19:**58–62; **20:**11; **23:**52; **24:**49
Craftsman Close-ups:
  chain-saw carvings: Pat Fushimi, **23:**40–43
  fish carvings: Rick Beyer, **21:**76–79
  marquetry: John Wilson, **17:**74–77
  miniature furniture: Noral Olson, **20:**40–43
  painting with wood: Judy Gale Roberts, **24:**38–43
  rockers: Hugh (Blow) and Jennie Vaughn, **19:**40–43
  shop teacher: Carmen Schifano, **18:**30–33
  timber-frame joinery, Samule Aaron, **22:**36–39
Cutter, string and tape, **22:**18
Cutting base, **19:**29
Cutting boards:
  Art-Deco, **24:**54
  sunburst, **24:**50–53

Continued

Print this article

Leg-rail joinery
Issue 20
Page 34

Wisconsin fish story
Issue 21
Page 76

Burl-topped coffee table
Issue 18
Page 40

Cutting boards *(Continued)*
Texas toast, **24:**55
tips for, **22:**83–84
Cypress, bald, **20:**33

D-F

Director's chairs, teak, **23:**65–69
Doll stroller, **20:**71–73
Dovetail jigs, **19:**34–39, 48–49
Dowel centers, use of, **20:**14
Doweling jig, **18:**81
Drawer pull, continuous, **21:**47
Drawer rattles, silencing, **19:**14
Drawing board, pantograph, **23:**58–59
Drawings and plans, reading, **18:**46–49
Drill presses, **24:**56–61
techniques with, **24:**26–31, 74–75
Drills and drilling:
bits for. *See* Bits
chuck adapter rings for, **17:**24
debris from, catching, **17:**19; **23:**14
Drum sanders, **20:**25; **23:**14
holder for, **17:**57
Dust control, **17:**16; **22:**12; **23:**14
equipment for, **17:**48–51, 87; **18:**90; **21:**22
Earrings, turned, **23:**64
Ebony, **20:**104
Epoxy, **19:**24; **23:**20
Extension tables:
for band saw, **18:**20
cushioning edges of, **18:**24
File cabinet, **21:**72–75, 88; **22:**11
Filigree, laser-cut, **22:**21
Finishes and finishing:
abrasives for, **20:**53
Amana varnish system, **19:**70–71
can lids, tight seal for, **20:**18
foam rubber for applying, **22:**12
lacquer, **18:**66–69
brushed, **22:**48–51
for pine, **19:**93–94
restorer, **17:**22
Sealacell system, **20:**26
wax, creme, **18:**81
for workshop floor, **20:**85
Floor, workshop, finishes for, **20:**85
Football award, **21:**56
Forstner bits, **20:**95–96
Frame clamps, making, **21:**16; **24:**18
Frames and framing, timber, **22:**36–39
Furniture. *See also* Chairs; Tables
Amana Colonies, **19:**66–69
finish for, **19:**70–71
cabinets:
corner, **23:**52
file, **21:**72–75, 88; **22:**11
cradles, **19:**58–62; **20:**11; **23:**52; **24:**49
from kits, **19:**50–53
miniature, **20:**40–43
settee, **17:**68–73
shelves and bookcases:
barrister's, **21:**66–71; **23:**10
standards for, **21:**58–61
wall system, **18:**58–63, 76, 79

G-I

Gauges:
blade-height, **22:**58–59
miter, **19:**18; **21:**20; **22:**12
wire/screw/drill bit, **19:**24
Glass cutting, straightedge for, **20:**23
Glasses, safety, **24:**64–67
Gluing:
break in wood, aligning, **20:**14
cracks, hairline, **17:**16
Gouges, bowl, **22:**24
Grinding jig, drill press, **24:**74–75
Gum, sweet, **23:**29
Handscrews, gripping, **24:**16
Hand tools: *See* Tools
Harp, **18:**52
Height gauge, **22:**58–59
Herringbone table, **22:**30–31, 34–35
Hinge mortises, cutting, **24:**37
Holes, drilling, **17:**24; **24:**26–28
Homemade tools:
blade-height gauge, **22:**58–59
bow sander, **18:**22
drum sanders, **23:**14
frame clamps, **21:**16; **24:**18
pantograph board, **23:**58–59
Homemade tools *(Continued)*
pin-routing attachment, **17:**38–39, 81
sawhorse, **24:**62–63
taper jig, **18:**45
tweezers, **18:**20
Hoods, dust collection, **17:**87
Horse, carved, **23:**53
Horse logging, **22:**68–73
Hourglass, **21:**57
Inlays, scroll-sawn, **20:**36–37
Insect control, **20:**14; **22:**18
Intarsia, **19:**56; **24:**38–43

J-M

Jarrah, **19:**103
Jars, spice, **21:**80
Jeep, toy, **18:**53
Jewelry:
earrings, turned, **23:**64
necklace, swan, **22:**66
Jewelry boxes, **23:**53; **24:**48
Jigs:
dovetail, **19:**34–39, 48–49
doweling, **18:**81
for finger joints, **17:**26
grinding, for drill press, **24:**74–75
taper, **18:**45
Jointer/planer blades, sharpening, **24:**31, 74–75
Joints and joinery:
dovetail, jigs for, **19:**34–39, 48–49
edge, with pipe clamps, **19:**85
finger, guide for, **17:**26
leg-rail, **18:**34–39
plate joiners, **23:**44–47
timber-frame, **22:**36–39
Key chain, **20:**70
Kit builders, **19:**50–53
Knives, pocket, **20:**21
Labels, gummed, removing, **21:**18
Lacquer, **18:**66–69
brushed, **22:**48–51
Lathe work. *See* Turning
Leg-rail joinery, **18:**34–39
Legs, cylindrical, repairing, **21:**16
Letter opener, **21:**54–55
Levels, spirit, **19:**82
Logging, **19:**54–55
horse, **22:**68–73
Logs, sawing, **21:**40–43
Mantel clock, **20:**54–57
Manufacturing:
plywood, **17:**64–67
Manufacturing *(Continued)*
saw blades, **22:**60–63
Maple bowl, **23:**36–37
Marquetry, **17:**74–77
Miniature furniture, **20:**40–43
Mirrors:
dinosaur, **19:**76–77
hand, quilt-look, **20:**76–77, 81
Miter cutoff fixture, **22:**21
Miter gauges, **21:**20
loose bar, fixing, **22:**12
squaring up, **19:**18
Mixing jobs, **19:**20
Models:
Rolls Royce, **21:**56
yacht, **18:**54–57
Moldings, **21:**44–49
picture frame, **21:**46, 50–53
Money clip, **20:**68–70
Mortise-and-tenon leg-rail joinery, **18:**34–39
Mortises, making, **24:**28
attachment for drill press, **24:**60
attachment for router, **22:**22
for hinges, **24:**37
Mosaic pictures, **19:**56; **24:**38–43
Musical instruments, **18:**52; **23:**60–63

N-P

Nails, holding, **21:**18
Nail set, offset, **19:**24
Necklace, swan, **22:**66
Notepad holder, **19:**63, 81
Oak:
English, **18:**25
herringbone table, **22:**30–31, 34–35
The Old Hand Ways (Roy Underhill):
The Blacksmith, **19:**96–98
The Woodlot, **21:**82–84, 86
Onlay technique, **22:**28–33, 77
Outdoor furniture:
settee, **17:**68–73
teak table and director's chairs, **23:**65–71
Padauk, **24:**25
Paint, aerosol, touch-ups with, **20:**14
Painting with wood, **19:**56; **24:**38–43
Paint remover, spray, **24:**80
Paint rollers, 3", **18:**20

Template routing techniques
Issue 17
Page 32

Barrister's bookcase
Issue 21
Page 66

Drawings and plans
Issue 18
Page 46

Harvest your own bowl blanks
Issue 20
Page 44

Paldao, **24:**23
Pantographs, **23:**56–59
Paperweight, executive, **18:**64–65
Patch, flush, on old veneer, **18:**86–87
Patterns, project:
  materials for making, **18:**22, **22:**16
  reproducing, **23:**54–59
Pegs, Shaker, **21:**20
Photographs of projects, **24:**44–47
Picture frames, **21:**50–53
  moldings for **21:**46, 50–53
Picture rail, **21:**48
Pine, finishing, **19:**93–94
Pin routing, **17:**32–37
  attachment for, **17:**38–39, 81
  project with, **17:**40–41
Pipe clamps, edge-joining with, **19:**85
Plane kit, **24:**80
Plane rack, **17:**52
Planer/jointer blades, sharpening, **24:**31, 74–75
Planers, power, hand-held, **18:**70–75
Plans and drawings, reading, **18:**46–49
Planters, **24:**68–72
Plaques:
  intarsia, **24:**43
  relief, **20:**36–37, 74–75
Plate joiners, **23:**44–47
Play structure, **23:**72–76
Plugs, dowel, making, **19:**20
Plunge routers, **21:**34–39
Plywood, manufacture of, **17:**64–67
Power tools. *See also* Routers and routing; Saws
  carvers, rotary, **19:**64–65
    attachments for, **19:**30
  combination woodworking machines, **22:**52–57
  drill presses, **24:**56–61
    techniques with, **24:**26–31, 74–75
  dust collection for, **17:**48–51, 87; **18:**90; **21:**22
  Forstner bits for, **20:**95–96
  joiners, plate, **23:**44–47
  keys, safekeeping for, **20:**16
  modular, **18:**81
  planers, hand-held, **18:**70–75
  swing-down storage for, **18:**20

R-S

Racks:
  clothes, rabbit, **22:**67
  plane, **17:**52
  record, in wall system, **18:**79
  wine, **20:**64–66
    in wall system, **18:**76
Radial arm saws, **17:**42–47
Rail-leg joinery, **18:**34–49
Record rack in wall system, **18:**79
Repair of old veneer, **18:**86–87
Rockers, Texas, **19:**40–43
Rolls Royce model, **21:**56
Rotary-cut softwood plywood, **17:**64–67
Router Master pad, **24:**79
Routers and routing:
  dovetail jigs for, **19:**34–39, 48–49
  moldings made with, **21:**44–49
  mortise attachment for, **22:**22
  plunge, **21:**34–39
  template, **17:**32–37
    attachment for, **17:**38–39, 81
    project with, **17:**40–41
Rules, folding, **21:**91, 93
Rust prevention, **20:**18
Safety:
  carving, **20:**29, 31
  clothing, proper, **20:**27
  glasses for, **24:**64–67
  lacquer, **18:**67
  radial arm saws, **17:**44
Safety glasses, **24:**64–67
Sailboat, model, **18:**54–57
Sanders and sanding:
  abrasives, **20:**50–53
  block, **23:**23
  bow, **18:**22
  with drill press, **24:**29
  drum, **20:**25; **23:**14
    holder for, **17:**57
  dust from, blowing away, **22:**12
  in grooves, **23:**16
  of miniature parts, **23:**20
  pads, foam brushes as, **17:**19
  sleeves, tungsten-carbide, **24:**80
Satinwood, **21:**30
Sawhorse, **24:**62–63
Sawmills, home, **21:**40–43
Saws and sawing. *See also* Band saws; Table saws
Saws and sawing *(Continued)*
  blades, **20:**60–62; **23:**26
    cleaning, **20:**21
    holders for, **19:**14
    maintenance of, **22:**80
    manufacture of, **22:**60–63
  chain:
    carver, using, **23:**40–43
    sharpening, 20:99, 101–102
Saws and sawing *(Continued)*
  panel, **20:**25
  radial arm, **17:**42–47
  sawdust buildup, preventing, **17:**16
  scroll, using, **19:**14; **20:**34–39, 74–75
Scrapers:
  for finishes, **19:**23
  for wood, **17:**22

PROJECTS

Belt buckles, **20:**80
Bird feeder, **19:**74–75
Blade-height gauge, **22:**58–59
Bowls, stave, **23:**36–39
Boxes, scallop, band-sawn, **21:**62–65
Bulldozer, **20:**78–79, 82
Candle holder, **20:**67
Carved figures:
  French Louie, **17:**78
  Hillbilly Will, **24:**76–77
Carving board for meat, **17:**40–41
Chairs, director's, teak, **23:**66–69
Cheese board, Art-Deco, **24:**54
Clocks:
  mantel, **20:**54–57
  tall, contemporary, **22:**40–47, 78
  teddy bear, **22:**64–65
  turned teak, **19:**78–79
Clothes rack, rabbit, **22:**67
Cradle, **19:**58–62; **20:**11
Cutting boards:
  Art-Deco, **24:**54
  sunburst, **24:**50–53
  Texas toast, **24:**55
Doll stroller, **20:**71–73
Drum-sander holder, **17:**57
Earrings, turned, **23:**64
File cabinet, **21:**72–75, 88; **22:**11
Grinding jig, drill press, **24:**74–75
Inlays, scroll-sawn, **20:**36–37
Key chain, **20:**70
Letter opener, **21:**54–55
Mirrors:
  dinosaur, **19:**76–77
  hand, quilt-look **20:**76–77, 81
Money clip, **20:**68–70
Necklace, swan, **22:**66
Notepad holder, **19:**63, 81
Pantograph drawing board, **23:**58–59
Paperweight, **18:**64–65
Picture frame, **21:**50–53
Plane rack, **17:**52
Planters, **24:**68–72
Plaques:
  intarsia, **24:**43
  relief, scroll-sawn, **20:**36–37, 74–75
Play structure, **23:**72–76
Puzzles, scroll-sawn, **20:**35
Routing attachment, **17:**38–39, 81
Sawhorse, **24:**62–63
Sculptured pictures, **20:**38–39
Serving board, **22:**74
Settee, **17:**68–73
Shelves:
  arched-top system, **18:**58–63, 76–79
  barrister's bookcase, **21:**66–71; **23:**10
Spice jars, **21:**80
Stack-cut ornaments, **20:**38–39
Tables:
  coffee, burl-topped, **18:**40–44
  dining:
    herringbone, **22:**30–31, 34–35
    sunburst, **17:**58–63
    teak, **23:**70–71
Taper jig, **18:**45
Tool chest, **19:**44–47
Trucks, toy, **20:**78–79, 82; **24:**32–36
Vases:
  onlay, **22:**33, 77
  turned, **19:**80
Wine rack, **20:**64–66
Yacht, model, **18:**54–57

Continued

Woodworker's tool chest
Issue 19 Page 44

12-Meter racing yacht
Issue 18
Page 34

Scroll-saw techniques
Issue 20
Page 34

Contemporary tall clock
Issue 22
Page 40

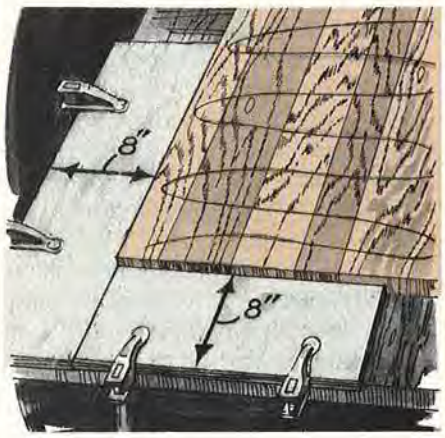
Screws:
broken, removing, **19:**14
slots in, deepening, **20:**23
Scroll saw, use of, **19:**14; **20:**34–39, 74–75
Sealant, silicone-type, **19:**29
Serving board, carved, **22:**74
Settee, **17:**68–73
Sharpening:
chain saw, **20:**99, 101–102
jointer/planer blades, **24:**31, 74–75
Sharpening stones, diamond, **23:**50–51
Shaves (spokeshaves), **19:**100
Shelves:
arched-top wall system, **18:**58–63, 76,79
barrister's bookcase, **21:**66–71; **23:**10
standards for, **21:**58–61
Spice jars, **21:**80
Spinning wheel, **24:**48
Spruce, Sitka, **17:**31
Stack cutting, **20:**38–39
Stave bowls, **23:**30–39
Stones, sharpening, diamond, **23:**50–51
Stop blocks, **22:**16
Storage bins from cans, **23:**18

T-Z

Tables:
coffee:
burl-topped, **18:**40–44
with stained glass, **21:**57
stump-based, **19:**57
dining:
herringbone, **22:**30–31, 34–35
sunburst, **17:**58–63
leg-rail joinery for, **18:**34–39
teak, **23:**70–71
Table saws:
aligning stock on, **22:**12
blade-height gauge for, **22:**58–59
cushioning edges of, **18:**24; **21:**16
miter-gauge squaring for, **19:**18
protectant for, **21:**22
Tall clock, contemporary, **22:**40–47, 78
Tape measures:
4-in-1, **19:**23
line drawn with, **18:**24
wasing, **24:**18
Taper jig, **18:**45
Taping:
stick-free, **20:**18
for trial assembly, **23:**16
Teak, **22:**27
table and chairs, **23:**65–71
wall clock, **19:**78–79
Techniques:
chain saw, sharpening, **20:**99, 101–102
chair caning, **23:**48–49
dovetails, routing, with jig, **19:**48–49
drill press, **24:**26–31, 74–75
edge-joining with pipe clamps, **19:**85
hinge mortises, cutting, **24:**37
leg-rail joinery, **18:**34–39
moldings, router, **21:**44–49
onlay, **22:**28–33, 77
photographing projects, **24:**44–47
scroll-saw, **20:**34–39, 74–75
stave-bowl construction, **23:**30–35
template routing, **17:**32–37
veneer, patching, **18:**86–87
Template routing, **17:**32–37
attachment for, **17:**38–39, 81
project with, **17:**40–41
Timber:
harvesting, **19:**54–55; **20:**44–49; **22:**68–73
identifying, **19:**91
sawmilling, **21:**40–43
Timber-frame joinery, **22:**36–39
Tool buymanship. *See* Buymanship
Tool chest, **19:**44–47
Tools. *See also* Homemade tools; Power tools; Sanders and sanding
as, making of, **19:**96–98
carving, **20:**21; **24:**79
chisels, **20:**26; **21:**24
clamps:
frame, **21:**16; **24:**18
pipe, edge-joining with, **19:**85
strap, **23:**24
collectible, **18:**50–51, 88
levels, **19:**82
shaves, **19:**100
dovetail jigs, **19:**34–39, 48–49
Tools *(Continued)*
gouges, bowl, **22:**24
miter gauges, **21:**20
maintenance of, **19:**18; **22:**12
nail set, offset, **19:**24
planes:
holder for, **17:**52
kit for, **24:**80
rules, folding, **21:**91, 93
saw, panel, **20:**25
scrapers, **17:**22; **19:**23
sharpening stones, diamond, **23:**50–51
tape measures, **19:**23
line drawn with, **18:**24
wasing, **24:**18
Toy bos, **18:**52
Toys:
bulldozer, **20:**78–79, 82
doll stroller, **20:**71–73
jeep, **18:**53
puzzles, scroll-sawn, **20:**35
trucks, **24:**32–36
Tracing materials, **22:**16; **23:**18
Tree harvesting, **19:**54–55; **20:**44–49; **22:**68–73
Tree quiz, **21:**94, 96
Tree species. *See* Wood species
Trucks, toy, **24:**32–36
Turning:
blanks for, harvesting, **20:**44–49
bowl gouges for, **22:**24
candle holder, **20:**67
clock, **19:**78–79
earrings, **23:**64
paperweight, **18:**64–65
spice jars, **21:**80
stave bowls, **23:**30–39
vase, **19:**80
Tweezers, homemade, **18:**20
Varnish, Amana system of, **19:**70–71
Vases:
onlay, **22:**33,77
turned, **19:**80
Veneer:
coffee table with, **18:**40–44
patching, **18:**86–87
Wall plaques:
intarsia, **24:**43
scroll-sawn, **20:**36–37, 74–75
Wall system, arched-top, **18:**58–63, 76, 79
Was, creme, **18:**81
Wine rack, **20:**64–66
Woodcarving. *See* Carving
Wood harvesting, **19:**54–55; **20:**44–49; **22:**68–73
Woodlot, **21:**82–84, 86
Wood movement, **18:**83–84
Wood production:
plywood manufacture, **17:**64–67
sawmilling, **21:**40–43
Wood quiz, **21:**94, 96
Wood scraper, **17:**22
Wood species:
aspen, **18:**29
bald cypress, **20:**33
balsa, **23:**83
Carpathian elm burl, **18:**40
ebony, **20:**104
English oak, **18:**25
identifying. *See* Identification of wood
jarrah, **19:**103
for musical instruments, **23:**60–63
padauk, **24:**25
paldao, **24:**23
red alder, **21:**33
satinwood, **21:**30
Sitka spruce, **17:**31
sweet gum, **23:**29
teak, **22:**27
western red cedar, **19:**33
Woodturning. *See* Turning
Woodworkers. *See also* Craftsman Close-ups
carvers:
Bigton, Else, **22:**74
Butz, Rick, **17:**78; **24:**96
Enlow, Harold, **24:**76–77
Weber, Fern, **22:**48–51
sawyer: Darrell Mattson, **21:**40–43
turners:
Bernson, Bruce, **19:**80
blank harvesting by, **20:**48–49
Brennion, Phil, **21:**80
Klein, Bonnie, **23:**64
Woodworker's standards:
bookcases and shelves, **21:**58–61
drawings and plans, **18:**46–49
patterns, reproducing, **23:**54–57
Woodworking books, **20:**58–59
Workstand, multiposition, **22:**22
Yacht, model, **18:**54–57

GET SMOOTH RESULTS FROM YOUR BELT SANDER

A belt sander makes fast work of smoothing down rough stock. But if you're not careful, you can end up with ridges and gouges that seem to take forever to sand away. Here's how to do a perfect job every time.

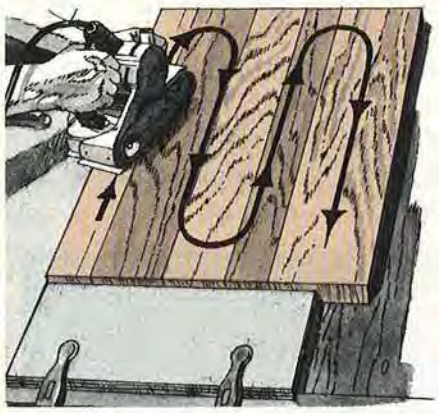


1 Belt sanders cut aggressively, so you've got to secure the workpiece to the bench before you start. Try this method: Clamp short, narrow stock in a vise, so it projects about ¼" above the clamp jaws.

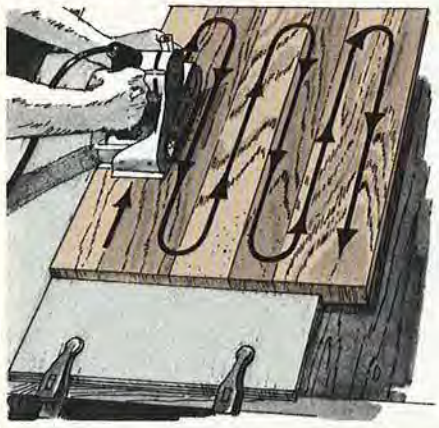
To secure wide stock, clamp 6"- to 8"-wide plywood stops where shown on the drawing *above.* Again, you want the top surface of the workpiece to project above the stop strips so they don't interfere with the sander.

An alternative method is adhering the workpiece to the work surface with double-faced carpet tape. If you don't mind sanding away the tape residue, you can save time and clamping materials this way.

Using a pencil, draw a wavy line across the surface of the stock, as shown on the drawing. This provides you with a visual reference while sanding—after you've completely sanded away the mark, it's time to switch to a finer-grit paper.



2 Starting with 120-grit sandpaper, set the sander on the stock midway between both ends as shown in the drawing *above.* Keep the sander perfectly flat to the wood surface when you turn it on. Hold the sander at a 15° to 20° angle to the direction you're sanding. Belt-sand up and down the length of the stock, moving to the right about 1" at the end of each pass. Let the machine's weight do the work.



3 After you've sanded away the wavy line, switch to a finer-grit belt. Draw a second wavy line, and make straight passes, holding the machine parallel to the grain as shown *above.* Move to the right about 1" after each pass. When the pencil line vanishes again, switch to a finer grit for finish sanding.

4 No matter how carefully you sand, there's always the chance that you'll accidentally gouge the wood. So, each time you finish sanding with a particular grit, check your work before moving to the next grit. We suggest you clamp a small light to your bench, as shown *above,* so that it illuminates the stock from a low angle. By standing behind the light and sighting down the length of the wood, you'll be able to see even the slightest gouges.

5 Sanding a narrow board or edge can be especially difficult because the sander tends to rock from side to side, rounding over the corners. Here's how to keep the corners sharp: Clamp a piece of scrap, called a *ledger,* to one side of the board (align both surfaces). Make the combined width of the ledger and board approximately equal to the width of the sanding belt. Draw a wavy line on the board and sand it, following the steps *above.*

Written by Jim Barrett Illustrations: Jim Stevenson

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UNCOMMON STOCKS

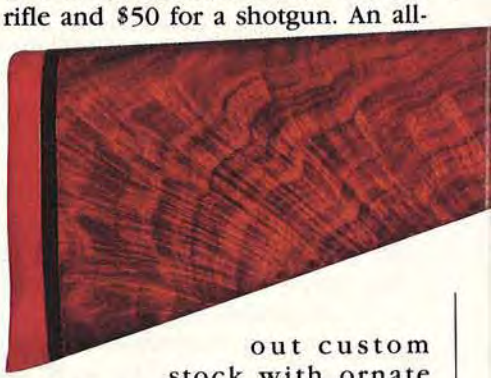
There's plenty of talk about the stock market in tiny Warsaw, Missouri. Not the Wall Street variety, though. Local folks, as well as sportsmen and firearms collectors the world over, prize the work of Reinhart Fajen, Inc., gunstock makers, as functional investments.

Anyone in the Missouri Ozark's town of Warsaw can direct you to Reinhart Fajen, Inc. "It's on Gunstock Drive, near Walnut."

No signs identify this world-renowned operation. And Reinhart Fajen doesn't even *look* like a factory. Production split among six widely dispersed buildings on the 7½-acre, tree-covered site reduces loss in the event of fire.

Despite this company's unassuming facade, a glimpse within reveals about 50 employees producing 35,000 to 45,000 gunstocks per year—making Reinhart Fajen, Inc. the world's largest producer of strictly gunstocks. Customers range from the person looking for a replacement stock for an inexpensive rifle or shotgun to the serious gun collector willing to part with equally serious amounts of money.

A semifinished stock, which requires the owner or a gunsmith to fit it to the action, starts at $40 for a rifle and $50 for a shotgun. An all-out custom stock with ornate hand-carving and checkering can cost the princely sum of $5,000—or lots more.



Customers don't even have to visit Warsaw. In fact, the company does most of its business by mail, with gunowners or gunsmiths.

◀ **Hand-checkering a gunstock 32 lines to the inch demands patience and precision from a Reinhardt Fajen craftsman. The reward is a sure grip.**

◀ **Shotgun with stump-figured walnut thumbhole stock and matching forearm**

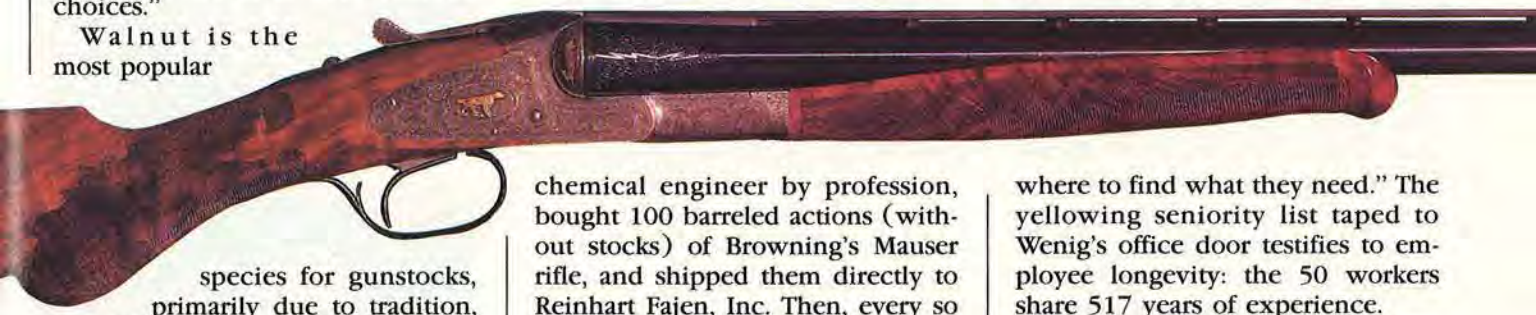
▼ **Classic double-barrel shotgun restocked with feathered-crotch walnut**

IMPROVING ON MOTHER NATURE

A gunsmith by trade, Reinhart Fajen began making custom replacement gunstocks by machine in 1939 with a partner, John Bishop. Until that time, gun owners had only two choices: the mass-produced stock supplied with the gun from the factory, or prohibitively expensive stocks made entirely by hand. Their new business was an immediate success—one that carried over to Fajen after he bought out Bishop in the fifties, and later to John Beringer, who purchased the company in 1987.

Natural differences in wood make each gunstock special. But the company improves that uniqueness with custom checkering, carving, and laminating dyed woods. New owner Beringer says matter-of-factly: "We offer over 100,000 choices."

Walnut is the most popular species for gunstocks, primarily due to tradition, but also because it absorbs shock well. In fact, walnut accounts for 90 percent of Fajen's production. Within the walnut family, though, fall American black walnut, California claro walnut, French walnut, and Bastogne walnut! Birch, maple, mesquite, myrtle, pecan, and sycamore round out the readily available species. But, within those woods you can choose from varieties of fiddleback, stump, crotch, or just plain fancy figure. Add to those choices camouflage and the light-dark contrasts possible with laminated wood, and you'll see how the company one-ups Mother Nature.



Not surprisingly, such highly figured wood couldn't possibly fall under traditional hardwood lumber grading standards. That's why the company applies its own. Here's just a sample of the grades they apply to walnut alone: *Utility* grade to *Supreme Deluxe* (four levels in plain walnut), *Semi-fancy* to *AAA Fancy* (another four levels in the lowest category of figured walnut), and *AAA Fancy Grade, Special Selection* (the cream of the crop in highly figured gunstock wood).

Sometimes, the customer supplies the gunstock blank for Fajen to turn and customize. Probably never, though, will they have another customer like the Georgia gun enthusiast who collects wood and combines both interests in a dramatic collection.

A few years ago, the Georgian, a chemical engineer by profession, bought 100 barreled actions (without stocks) of Browning's Mauser rifle, and shipped them directly to Reinhart Fajen, Inc. Then, every so often, unusual pieces of wood—acquired during world travel—arrived to be made into gunstocks. The most unusual arrival to date: a rare blank of pink ivory. At last count, the well-traveled collector had 60 custom-stocked rifles, identical except for the species of wood. Forty actions remain in the company's vault, awaiting whatever wood arrives next.

UNSIGNED WORKS OF ART

"Our people are artists in a business climate," Beringer states. Although these works of art leave the factory unsigned, most gun dealers can identify the company's work easily by the styling and the quality of the wood-to-metal fit.

Says Marty Fajen, sales manager and daughter-in-law of the founder, "I can be watching a movie and spot one of our stocks right away." That's because even Fajen stocks for factory replacements don't slavishly duplicate the originals, but include subtle changes.

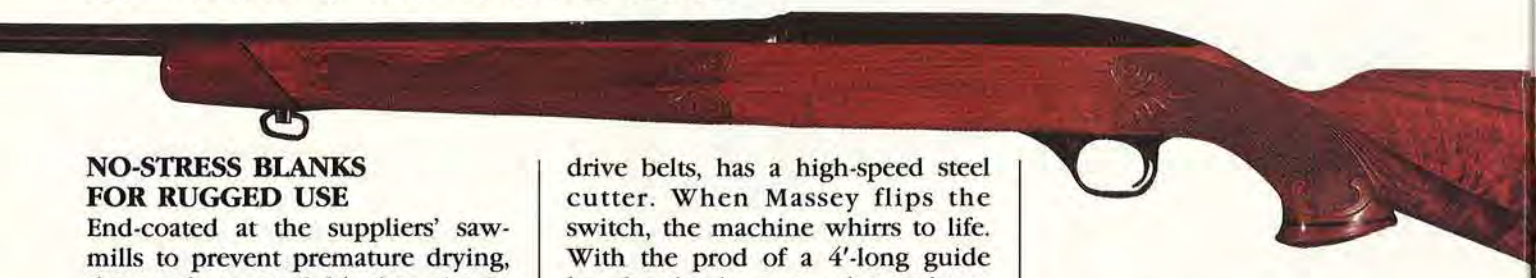
"We don't make our stocks from blueprints," explains Fred Wenig, a 33-year Fajen veteran, "we make them from patterns." Wenig, who his boss calls the best gunstock maker in the country, points to rows of full-sized walnut patterns lining walls like silent sentries.

The apparent random storage of the pattern stocks doesn't seem to bother anyone, though. "Most of our fellas have worked here a long time," Wenig says. "They know where to find what they need." The yellowing seniority list taped to Wenig's office door testifies to employee longevity: the 50 workers share 517 years of experience.

Eighty percent of Fajen's business (primarily mail order; see catalog note at the end of this article) comes from gun shops, and the remainder from individual gun owners. However, Fajen representatives do attend the nation's largest gun shows and sportsmen's conventions to offer personalized attention. For instance, they offer a custom-fitting service. Once Fajen knows all dimensions, they custom-tailor a stock. According to Wenig, a dedicated shooter sees custom-tailoring guns and rifles as no more extravagant than a businessman's made-to-order dress shirts.

Continued

UNCOMMON STOCKS



NO-STRESS BLANKS FOR RUGGED USE

End-coated at the suppliers' sawmills to prevent premature drying, the rough-cut stock blanks arrive in Warsaw with about 40 percent moisture content. To ensure uniform drying, the first part of the drying process in the two Fajen kilns (each holds 22,000 gunstock blanks) adds steam to bring every piece of wood to the same moisture content level.

"Then," notes Wenig, "we start drawing the water out . . . slowly." For the 2¼"-thick blanks, slowly means up to six months to reach 8 percent moisture content. Even under these carefully controlled conditions, Fajen loses 3–6 percent of its blanks to splitting.

If a blank doesn't split in the kiln, Fajen craftsmen see to it that it won't split under the rigors of use, either. This insurance begins with laying out a pattern on the stock blank. Grain direction in the grip area behind the trigger—the thinnest part of the stock—becomes especially critical. The shock of recoil will surely split the stock if the grain doesn't run straight "downhill" to the butt. That also holds true for the forearm section. Fajen orders its gunstock blanks slightly oversize to allow accurate grain orientation in layout.

After being marked for grain direction, blanks proceed to the 36" band saw, where they take on a rough shape. Further rough-shaping on a duplicating lathe removes the corners of the blank.

FINE-TUNING FOR FIT BEGINS 24 AT A TIME

Lew Massey runs duplicating carving machines that simultaneously produce up to 24 imitations of a pattern stock. "I've made a lot of sawdust since I started here in 1961," he quips.

Each of the spindle heads, connected to a single motor with flat drive belts, has a high-speed steel cutter. When Massey flips the switch, the machine whirrs to life. With the prod of a 4'-long guide bar, he slowly moves the unsharpened stylus toward the master pattern. As cutters contact the blanks, Massey directs a cut less than 1/16" deep on each.

When he shifts his grip for the next cut, the blanks gradually begin to take the pattern's shape. In an hour and forty-five minutes, the 24 stocks have been carved to completion, and move on to the next craftsman for more processing.

Fajen employees pride themselves on their gun stocks' wood-to-metal fit. Duane Kindle's 23 years of experience makes the intricate cuts in the stock for the barrel and receiver look effortless.

Kindle clamps an unfinished stock in a padded-leg vise, then brushes the underside of a gun barrel with "inletting black," a black marking powder. He then eases the barrel into position, gives it a tap with the heel of his hand, and takes the barrel out again. Where the powder leaves its mark, he removes a few thin curls with a gouge.

The wood-to-metal fit means more than appearance. If not fitted just right, the barrel can tear apart a stock with force from the recoil.

SAWDUST MIX FOR UNDETECTABLE REPAIRS

Gene Coffey collects sawdust. His workbench boasts nearly two dozen jars filled with the sawdust of different-colored wood. He mixes it with epoxy to fill pin knots and other small defects in gunstocks before finishing.

For larger repair jobs, he inserts solid wood patches made from scrap wood. He looks first for color match, not species. He freely intermixes the different varieties of walnut, and will even insert a maple patch into walnut sapwood. "As long as it looks right," he says.

◀ An irregular stump figure stock, plus carving, fits this Winchester rifle.

▼ With a carving gouge, Duane Kindle removes wood from the stock to match the gun's action. A bad fit could splinter the stock.

Some repairs require an inlay technique. Coffey shapes the bed of the area of the patch with a ⅛"-diameter bit in a Dremel Moto-Tool. Then, he completely covers the area with masking tape. After cutting tape out of the patch area for a pattern, he searches for a scrap piece that will match the color and figure of the stock. A bit of final whittling gives the wood a snug fit.

FINE FINISHES FOR FIELD OR FANCY

Bobbie Park fills grain and sands wood. With an air-powered Sears pad sander and a circular motion, he sweeps over convex curves and concave hollows. He uses 100-grit sandpaper for initial smoothing, then dampens the wood with water to raise the grain before switching to 180-grit sandpaper for the final go-over.

Walnut has open grain. For a smooth finish, Park fills it with a creamy, walnut-colored paste wood filler slathered on with a brush. He doesn't wait for the solvent to "flash off" and lose its sheen before scrubbing the filler into the pores and off the surface with a burlap rag. After the filler dries, Park again machine-sands with fine 180-grit sandpaper.

Stocks marked to receive the pattern of tiny diamonds called checkering get all of Darrell Smith's attention. For 15 years he has produced the carved, low-relief designs that provide a better grip in the most-handled areas of the stock.

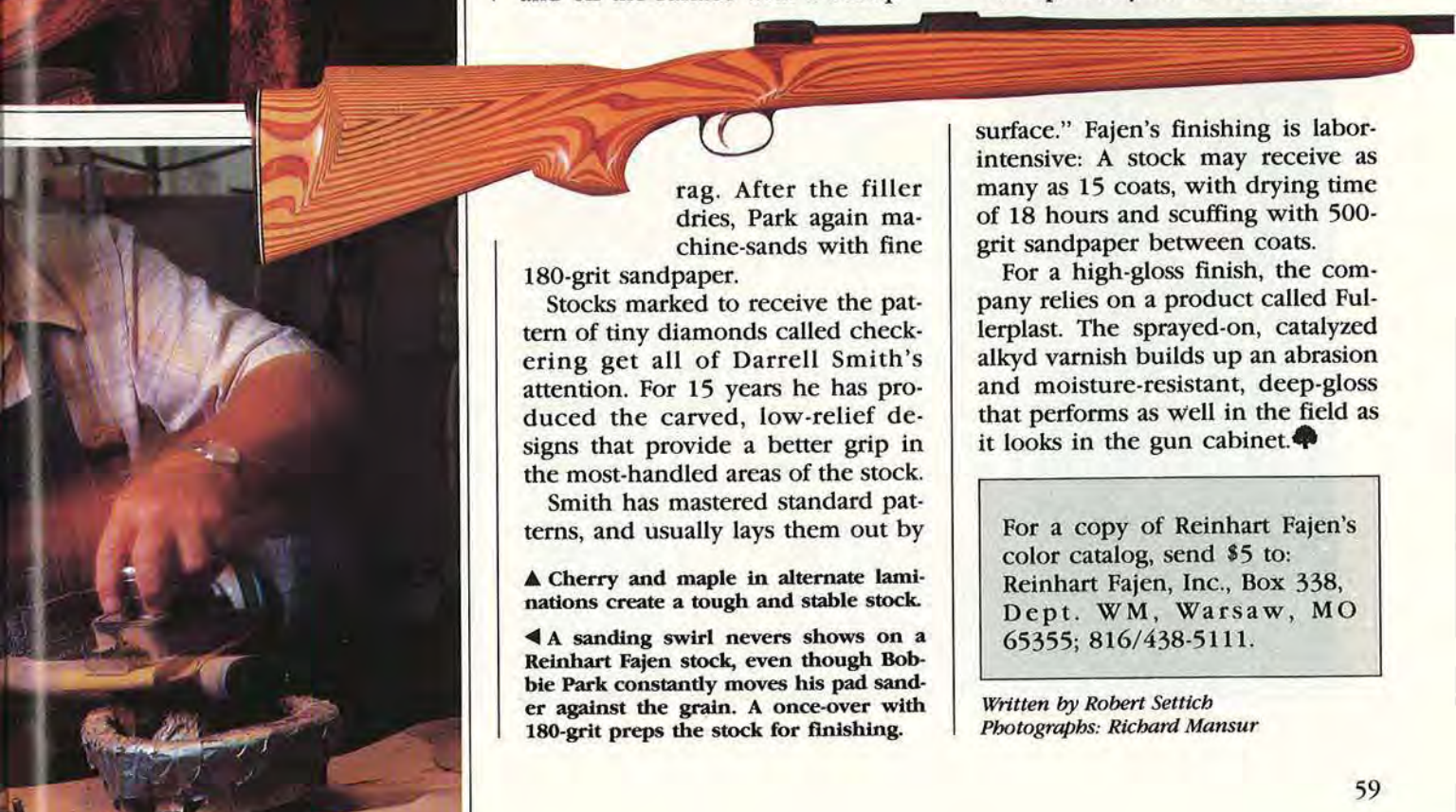
Smith has mastered standard patterns, and usually lays them out by eye. With a few quick pencil strokes, he outlines the checkering on a custom stock. He then grabs a checkering tool. With a few deft strokes of its carbide cutter, he replaces the pencil marks with V-cuts. The bite of a Foredom flexible-shaft power tool featuring a serrated cutting wheel follows this.

Smith refines the pattern by hand. Fajen offers variety in the spacing of their checkering, from 18–32 lines per inch—the higher the number the greater the cost. Smith can also carve detailed outlines and floral accents around checkered areas.

At Reinhart Fajen, custom gunstocks traditionally receive two coats of a Sherwin Williams' dull-sheen, sprayed-on catalyzed (two-part) lacquer called Sher-Wood Super Kemvar C. It has a close-to-the-wood look with little gloss.

Still, many collectors prefer traditional oil because it highlights wood figure without the buildup of a surface finish—even though it isn't weatherproof. "The oil is used only to finish filling the pores of the wood," Wenig explains, "and we wipe every bit we can from the surface." Fajen's finishing is labor-intensive: A stock may receive as many as 15 coats, with drying time of 18 hours and scuffing with 500-grit sandpaper between coats.

For a high-gloss finish, the company relies on a product called Fullerplast. The sprayed-on, catalyzed alkyd varnish builds up an abrasion and moisture-resistant, deep-gloss that performs as well in the field as it looks in the gun cabinet.



▲ Cherry and maple in alternate laminations create a tough and stable stock.

◀ A sanding swirl nevers shows on a Reinhart Fajen stock, even though Bobbie Park constantly moves his pad sander against the grain. A once-over with 180-grit preps the stock for finishing.

For a copy of Reinhart Fajen's color catalog, send $5 to: Reinhart Fajen, Inc., Box 338, Dept. WM, Warsaw, MO 65355; 816/438-5111.

Written by Robert Settich
Photographs: Richard Mansur

Print this article

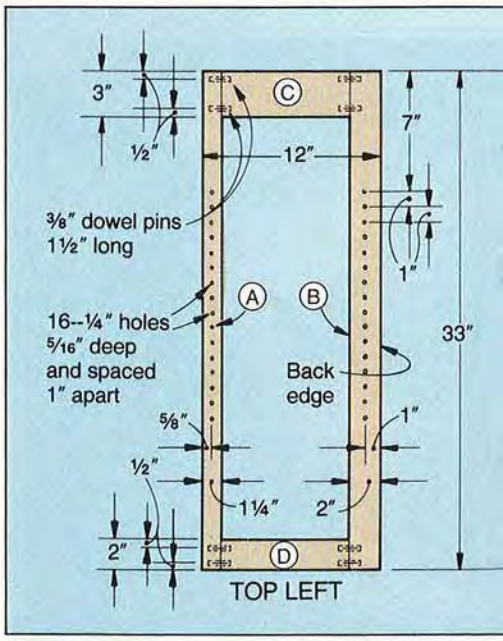
SHOWCASE YOUR CHERRY

At first glance, our curio cabinet may seem like a major undertaking. But, if you'll take a good look at the drawings, you'll notice the entire project consists of just four subassemblies that form identical top and bottom cabinets. Come on; give this project a try. We know that you'll be pleased with the results.

START WITH THE FOUR SIDE FRAMES

Note: *For ease in construction, the side frames for the top and bottom cabinets match except for the rail placement. For a well-balanced design, we placed the wider rails (C) on the bottom of the bottom frames and along the top edge of the top frames. Study the drawings carefully before beginning construction of the side frames.*

Cut the side frame stiles (A, B) and rails (C, D) to the sizes listed in the Bill of Materials on page 63.



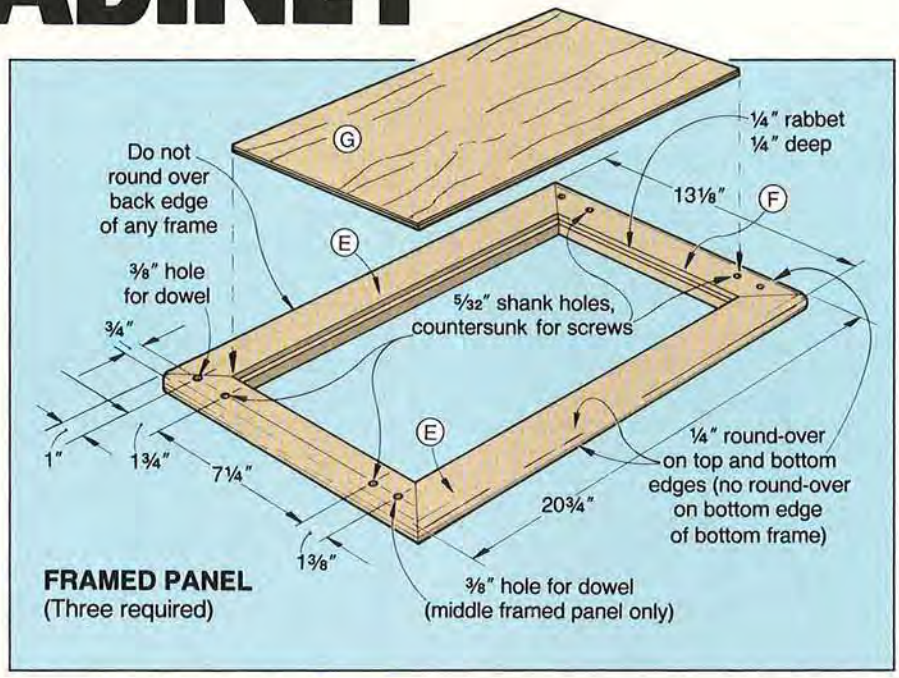
COLLECTIBLES IN THIS STUNNING

CURIO CABINET

2 Clamp each frame together in the configurations shown on the Side Frames Drawing. Make marks for a pair of dowel holes at each glue joint. Remove the clamps. Using a doweling jig for alignment, drill 3/8" holes 13/16" deep at each mark.

***Note:** When working with cherry, immediately remove all excess glue to prevent light-colored marks from appearing after staining. We wiped off all the glue squeeze-out with a damp cloth after clamping.*

3 Glue, dowel, and clamp each side frame, checking for square.
4 Mark the center points, and drill the 1/4" shelf holes 5/16" deep where dimensioned on the Side Frames Drawing. Sand the frames smooth.

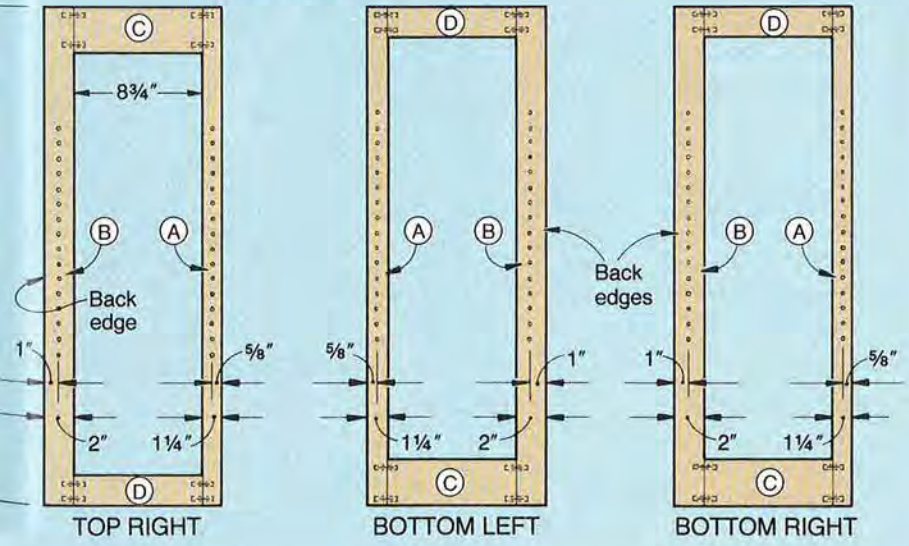


FRAMED PANEL
(Three required)

NOW, BUILD THE THREE FRAMED PANELS

1 Miter-cut the framed panel fronts and backs (E) and the sides (F) to length from 3/4"-thick stock 2" wide.
2 Using a dado blade or dado set mounted to your table saw, cut a 1/4" rabbet 1/4" deep along the top inside edge of each frame member.
3 Using band clamps, glue and clamp each frame together, checking for square. Later, remove the clamps, and sand each of the three frames smooth.
4 Measure the openings, and cut the insert panels (G) to fit from 1/4" cherry plywood. (See the Buying Guide on page 65 for our source of cherry plywood.) Glue and clamp the insert panels into place.
5 Rout 1/4" round-overs along the edges of the framed panels where noted on the Framed Panel Drawing. Sand each assembly smooth.

SIDE FRAMES

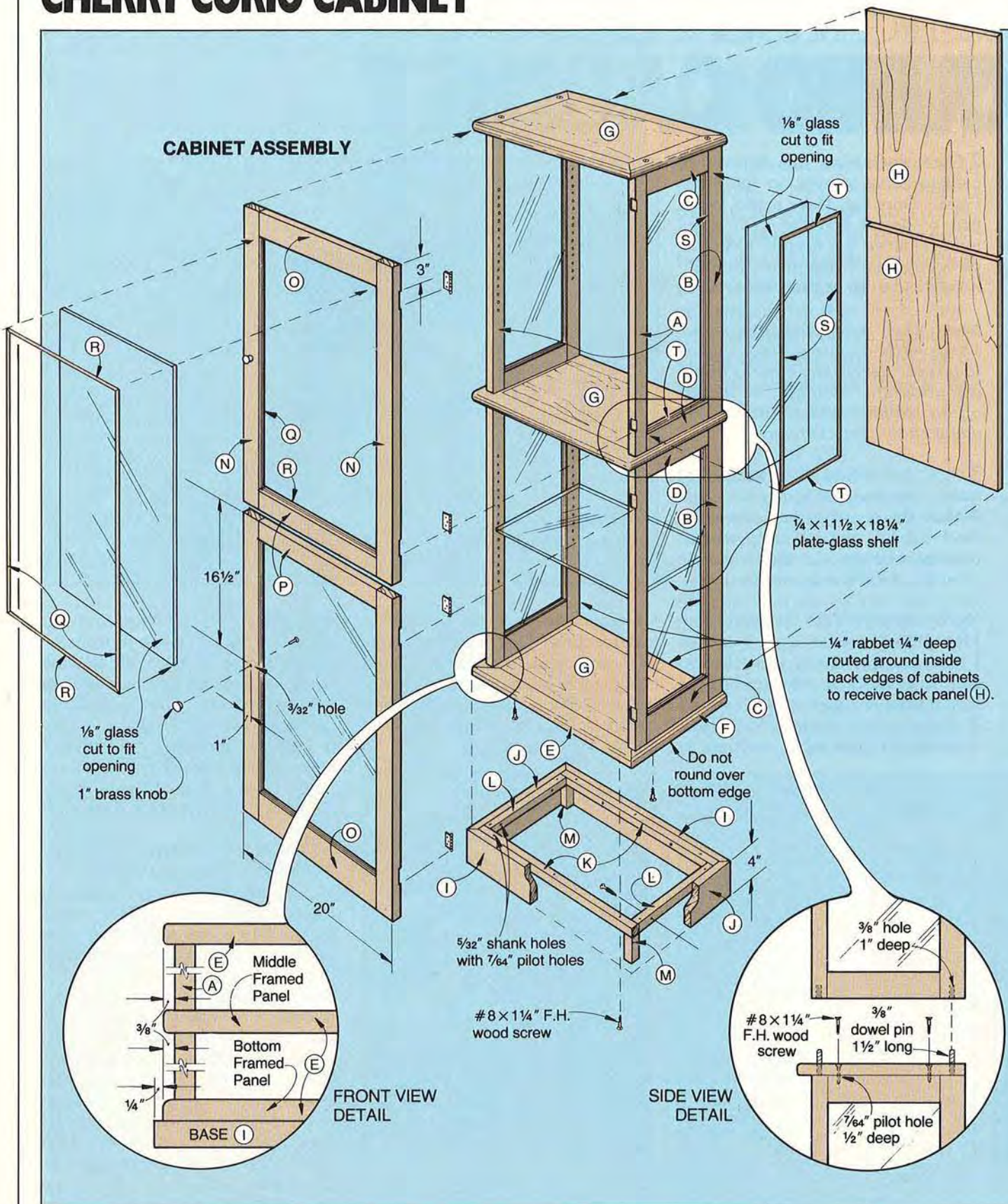


ATTACH THE SIDE FRAMES TO THE FRAMED PANELS

1 Using the Framed Panel Drawing for reference, mark center points for the four screw locations on the top face of each framed panel. Drill the 5/32" shank holes. Next, countersink the shank holes in the top and middle framed panels from the *top* side; then, countersink the bottom framed panel from the *bottom* side.
2 Mark the four dowel-hole center points on the top face of the middle framed panel (see the Framed Panel Drawing for locations). Drill the 3/8" dowel holes where marked.
3 With the back edges flush, clamp the two bottom frames between

Continued

CHERRY CURIO CABINET



Bill of Materials

Part	Finished Size* T	W	L	Materials	Qty.
FOUR SIDE FRAMES					
A	¾"	1¼"	33"	cherry	4
B	¾"	2"	33"	cherry	4
C	¾"	3"	8¾"	cherry	4
D	¾"	2"	8¾"	cherry	4
THREE FRAMED PANELS					
E	¾"	2"	20¾"	cherry	6
F	¾"	2"	13⅛"	cherry	6
G	¼"	9⅝"	17¼"	cherry ply.	3
TWO BACK PANELS					
H	¼"	19"	33½"	cherry ply.	2
BASE					
I	¾"	4"	21¼"	cherry	2
J	¾"	4"	13⅜"	cherry	2
K	¾"	¾"	19¾"	cherry	2
L	¾"	¾"	10⅜"	cherry	2
M	¾"	¾"	3¼"	cherry	4
TWO DOORS					
N	¾"	2"	32⅞"	cherry	4
O	¾"	3"	16"	cherry	2
P	¾"	2"	16"	cherry	2
GLASS STOPS					
Q*	¼"	¼"	27⅞"	cherry	8
R*	¼"	¼"	16"	cherry	8
S*	¼"	¼"	28"	cherry	16
T*	¼"	¼"	8¾"	cherry	16

*Parts marked with an * are cut larger initially, and then trimmed to finished size. Please read the instructions before cutting.

Supplies: #8×1¼" flathead wood screws, #4x½" flathead wood screws, #18×½" brads, ⅜" dowel pins 1½" long, ¼" plate glass for the shelves, 4—⅛" glass for the side frames, stain, finish.

"With a display case such as this, the focus should be on the items being showcased rather than on their enclosure. That's why I specified cherry throughout; it has rich-looking, yet subtle grain that's quite easy to live with. I can certainly see why generations of furniture makers have turned to cherry for their creations."

Jim Downing, Design Editor

the bottom and middle framed panels, checking for square. (See the Front View Detail accompanying the Cabinet Assembly Drawing for frame location.) Using the previously drilled shank holes in the framed panels as guides, drill 7/64" pilot holes ½" deep into the side frames (see the Side-View Detail for reference). Now, remove the clamps, and glue and screw the two side frames between the two framed panels.

4 Lay the bottom cabinet assembly on its back. Insert dowel centers into the ⅜" dowel holes in the top face of the middle framed panel. Clamp the top side panels in position between the top framed assembly and bottom cabinet assembly to transfer the dowel hole center points onto the bottom edge of the upper side frames. Now, using the previously drilled shank holes in the top framed assembly as guides, drill 7/64" pilot holes ½" deep into the top of the upper side frames.

5 Remove the top cabinet assembly, and drill the mating dowel holes in the bottom edge of the upper side frames where indented.

6 Install the dowels pins into the dowel holes in the middle framed panel. Next, glue the top cabinet to the bottom cabinet assembly.

7 Carefully lay the cabinet face-down on a work surface covered with a blanket to prevent scratching the cabinet. Then, rout a ¼" rabbet ¼" deep around the inside edge of the upper and lower cabinet assemblies for the ¼" plywood back panels (H). Finally, chisel the rounded corners square.

8 Cut the two back panels (H) to fit the rabbeted openings. Glue and brad the ¼" back panels into place (we used #18×½" brads).

CONSTRUCT THE BASE

1 Miter-cut the exterior base parts (I, J) to size. Now, cut the base cleats (K, L) and glue blocks (M) to size. Drill and countersink screw holes into the cleats.

2 Glue and clamp the exterior parts together with a band clamp, checking for square. Then, glue and screw the cleats into place flush with the top edge of the exterior base parts. Add the glue blocks, and sand the base smooth.

3 Set the cabinet upside down on a blanket. With the back edges flush, center the base (also upside down) from side to side on the bottom framed panel. Glue and screw the base to the lower framed panel.

BUILD THE DOOR FRAMES

1 Rip and crosscut the door stiles (N) and rails (O, P) to size. Clamp each door frame together and make marks for a pair of dowel holes at each joint line. Then, with a doweling jig, drill ⅜" holes 9/16" deep.

2 Glue, dowel, and clamp each door frame together, checking for square. Later, remove the clamps and sand the door frames.

3 Place the cabinet on its back. Check the fit of the doors on the cabinet front. The sides of the doors should fit flush with the sides of the cabinet; plane the edges of the doors if necessary. You also want a 1/16" gap between the top and bottom of the doors and the framed panels. (When fitting the doors we marked one door as "upper" and the other as "lower" for ease in final assembly later.

Continued

CHERRY CURIO CABINET

CUT AND INSTALL THE GLASS STOPS

1 Cut nine pieces of ¾"-thick cherry to 1½" wide by 36" long. Rout a ¼" round-over along all four edges of each piece.

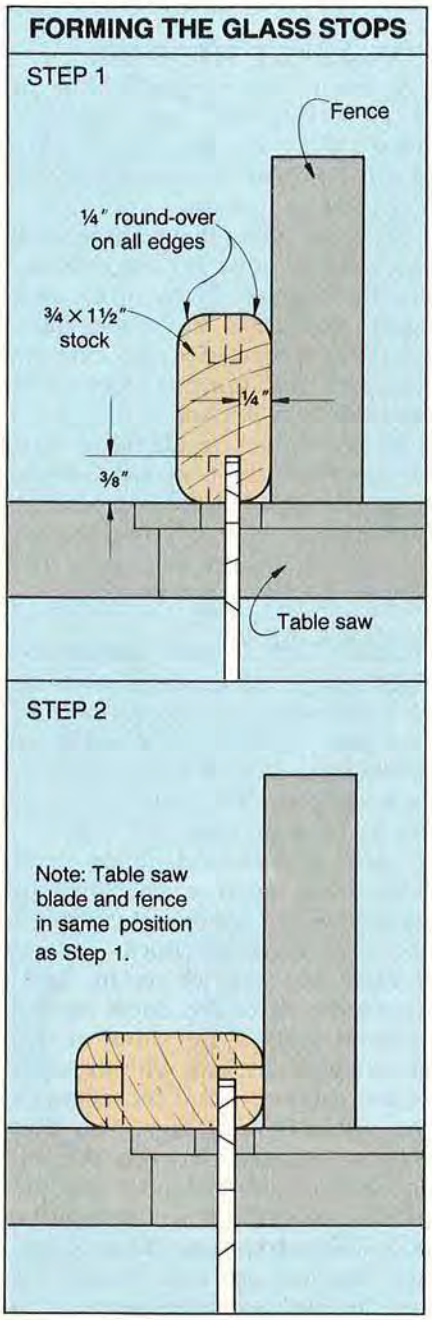
2 As shown in the two-step drawing *below*, cut four quarter-round cherry stops from each 1½×36"-long strip. (We used a push stick for safety when cutting the long, thin stops.)

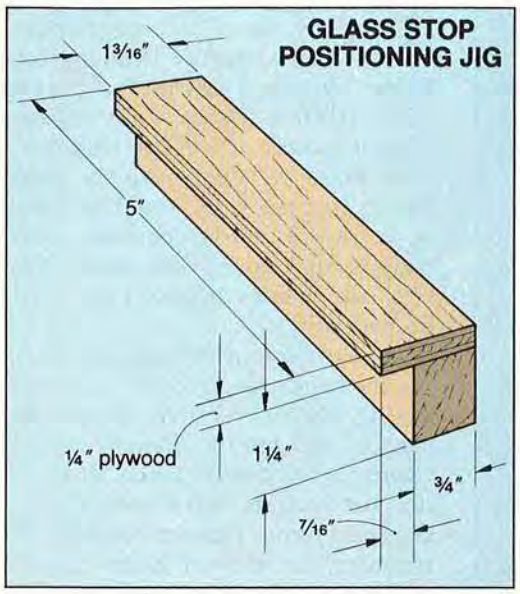
3 Starting with one side panel, measure the opening and miter-cut the long glass stops (S) to length.

4 Construct the jig shown *below*. Snip the head off a 18x½" brad and chuck it into your drill. Use the jig to position the stops in the front of the frame. Drill through the stop as shown in the photo *below right*. Tap a brad into place in the hole just drilled. Fasten the *outside* stops on each side frame and the *front* stops on both door frames; space the brads about 7" apart. Set the brads, and fill the holes with putty. (You'll need the remaining stops later when installing the glass.)

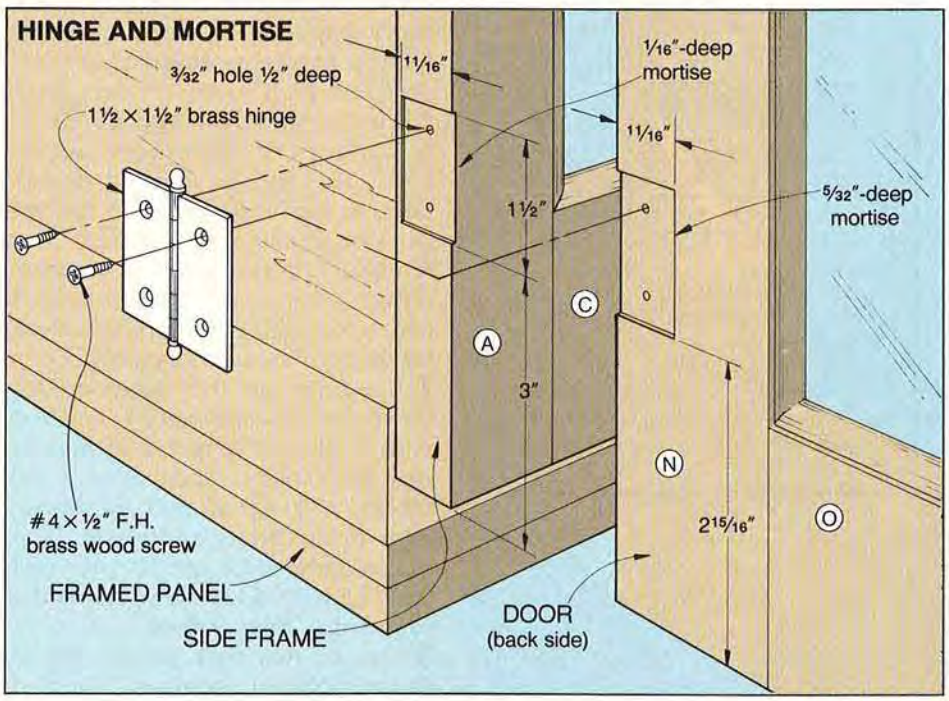
HERE'S HOW TO HANG THE DOORS

1 Mark the hinge locations on the front of the right-hand side frames where shown on the Hinge and Mortise Drawing.





Use the jig to position the glass stops. Then, drill pilot holes and brad the stops into place.



2 Position the hinge on the marked outline, mark the screw hole locations, and drill the pilot holes.

3 Screw the brass hinges to the side frames and score their outline into the frames as shown in the photo *below*. Remove the hinges.

4 Chuck a ⅜" or ½" straight bit into your router. Clamp a piece of scrap stock to the inside edge of one of the side frames, making sure the top edges of the scrap stock and the frame are flush. The scrap stock helps support and level the router when routing the hinge mortise. Next, routing just *inside* the marked lines, rout 1/16"-deep mortises as shown in the photo *below*. Use a sharp chisel to finish cutting to the scribed-hinge outline.

5 Clamp the doors into position in the cabinet front openings, and transfer the hinge locations onto the doors. Remove the doors from the cabinet, and finish marking the hinge outline. Using the routing and chiseling method just described, rout 5/32"-deep mortises on the back side of each door frame.

Screw the hinges to the cabinet. Next, scribe the hinge locations into the front of the side frame.

Clamp a piece of scrapwood to the front of the side frames for additional support, and rout the hinge mortises.

FINAL ASSEMBLY

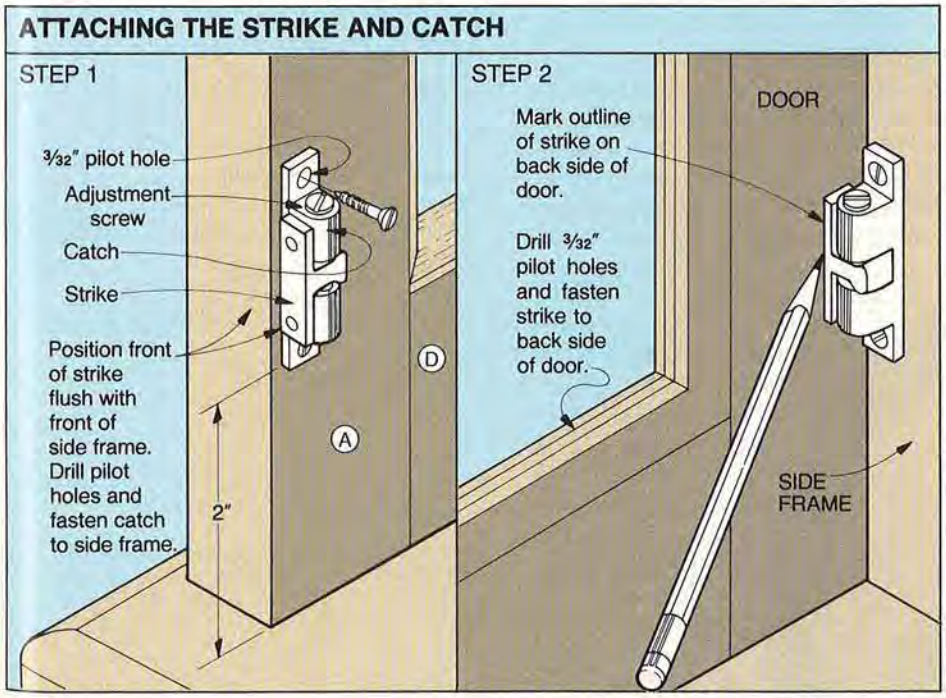
1 Measure the openings and order glass cut to size for the four side panels, the two doors, and the three shelves. (We had the glass cut 1/16" less in length and width for the doors and side frames to allow for movement of the wood.)

2 Locate and drill the holes for the door knobs where shown on the Cabinet Assembly Drawing. Follow the two-step drawing *below left* to attach the catches and strikes.

3 Position the glass, and then carefully drill the holes and brad the remaining cherry glass stops to the back side of each glass panel. Set the nails and fill the holes.

4 Remove all the hardware from the cabinet and doors. Sand the wood parts smooth. Mask off both sides of the glass. Stain the cabinet and doors (we used cherry stain), and apply the finish.

5 Attach the two doors to the cabinet, place the cabinet against a wall, and add the glass shelves.


ATTACHING THE STRIKE AND CATCH
STEP 1
3/32" pilot hole
Adjustment screw
Catch
Strike
Position front of strike flush with front of side frame. Drill pilot holes and fasten catch to side frame.
2"
D
A
STEP 2
Mark outline of strike on back side of door.
Drill 3/32" pilot holes and fasten strike to back side of door.
DOOR
SIDE FRAME

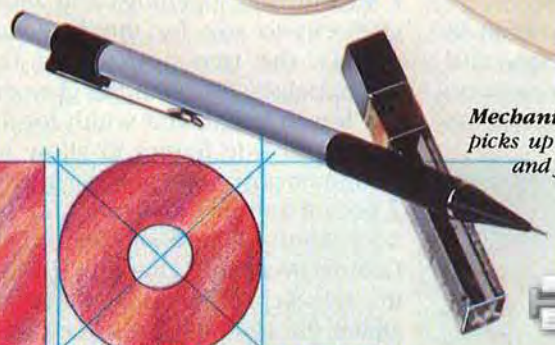
BUYING GUIDE

• **Hardware.** Two pairs of 1½×1½" solid brass hinges, catalog no. D1910, $10.95/pair. Brass ball catch, catalog no. D3910, $2.10 each (two required). Brass shelf supports, catalog no. D5736, 14 cents each (12 required). Brass knobs, catalog no. E1136, $4.10 each (two required). Add $3.50 per order for postage and handling. The Woodworkers' Store, 21801 Industrial Blvd., Rogers, MN 55374.

• ***¼*" cherry plywood.** Four pieces 24×48" for parts G and H. $53 ppd. from The Woodworker's Dream, 510 Sycamore St., Nazareth, PA 18064; 800-247-6931 (in Pennsylvania 215/759-2837).

Produced by Marlen Kemmet
Project Design: James R. Downing
Photographs: Bob Calmer
Illustrations: Mike Henry, Bill Zaun

French Curves: *Draw smooth curves for scroll saw patterns with these drawing tools.*



Mechanical Pencil: *This 5-mm model picks up where wood pencils leave off and fits the compass shown below.*

10 LAYOUT TOOLS

no woodworker should be without

Print this article

Many woodworking projects call for the woodworker to "mark a radius," "scribe a circle," "trace a pattern," or any number of other operations. And yet, many woodworkers haven't purchased the drafting tools shown here—items that will increase your accuracy and make marking and measuring chores routine.

Draftsmen rely on specialized layout tools to produce top-quality work. In their business, it's not good enough to be "almost-on." They've got to be exact. And so do woodworkers.

THE BASIC SEVEN

Mechanical Pencil. For precision in tracing patterns and marking cutoff lines, it's tough to beat the consistent, fine line of a mechanical pencil.

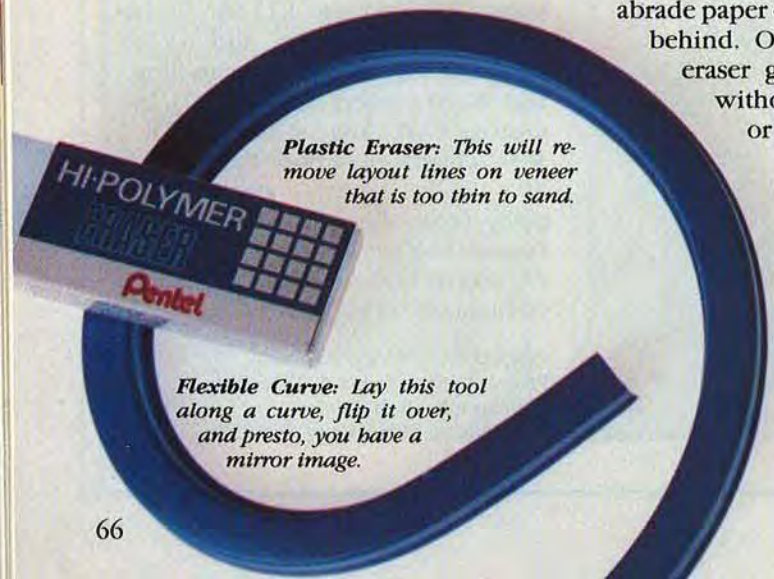
Plastic Eraser. Not all erasers are created equal. Plastic erasers won't abrade paper or leave a fuzzy line behind. On wood, a plastic eraser gets into the grain without leaving a mark or residue.

French Curves. These ingenious tools have nearly all the curves you'll ever need to enlarge a pattern onto a grid. Just transfer the pattern's grid intersection points to a larger grid, and use a french curve to connect the points. We suggest you purchase three sizes—the Alvin 351, 352, and 353 set works well—so you'll always have the radius you need.

Adjustable Triangle. Because this versatile tool adjusts from 0 to 90°, it saves you the cost of buying numerous triangles, while guaranteeing accurate angle cuts every time. We like the Mars Staedtler 6" model for its quality and convenient size.

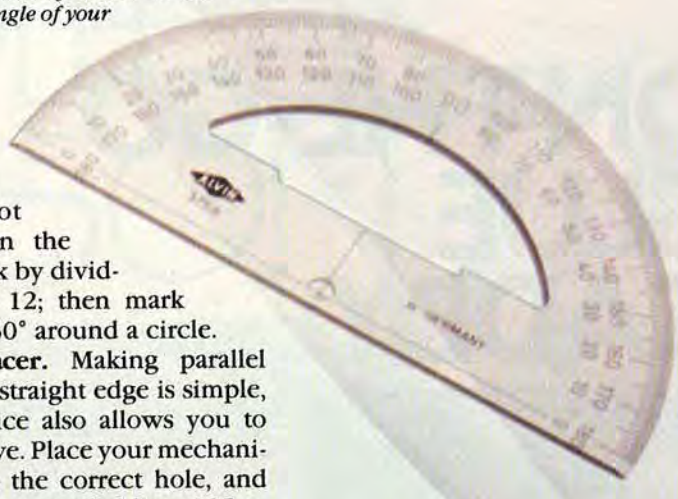
WOOD® magazine Design Editor Jim Downing knows all about the versatility of this tool. "I keep one in my shop for adjusting the table saw, band saw, radial arm saw, and drill press for precise angle cuts. I

Compass: *This model will also accept an X-acto knife for cutting thin materials, such as paper or veneer.*



Plastic Eraser: *This will remove layout lines on veneer that is too thin to sand.*

Flexible Curve: *Lay this tool along a curve, flip it over, and presto, you have a mirror image.*



Protractor: *Adjust a sliding bevel from 90° to 180° with a protractor to set the angle of your jointer fence.*

never rely solely on the machine's angle markings."

Circle Templates. How many times have you searched for a jar lid to draw a circle? Next time, use a circle template in combination with a mechanical pencil to get premeasured, perfectly round circles. With these two templates, you can make any of 50 different circles from 1/16 to 3".

These make drawing corner radii easy, too. If a plan calls for a 1" radius, select the 2"-diameter circle, nestle it in a corner until two edges make contact, and draw the radius.

Protractor. Inexpensive, but handy, a protractor provides an easy and accurate way to set a sliding bevel and check other angles.

You also can use a protractor to divide a circle into segments by dividing the necessary number of parts into 360° (an entire circle). For example, plot the hours on the face of a clock by dividing 360° by 12; then mark hours every 30° around a circle.

Parallel Spacer. Making parallel lines along a straight edge is simple, but this device also allows you to parallel a curve. Place your mechanical pencil in the correct hole, and you can draw a parallel line .025 to .5" (1/40 to 1/2") from any edge.

THREE NICE-TO-HAVE TOOLS

Compass. The Mars Staedtler model we've chosen draws circles up to 14" in diameter.

With a compass, you can create an infinite number of circle sizes and perform many more advanced geometric functions such as dividing an angle or drawing an ellipse.

Flexible Curve. You can bend this model to nearly any shape up to 20" long. Because it will retain its shape, you can transfer exact curves easily by lifting the tool and moving it.

Matte Acetate. Copy a pattern onto this material as with tracing paper and enjoy these advantages:

- Acetate is more durable and transparent than tracing paper.
- You can use acetate over and over to transfer patterns onto wood surfaces. Just sandwich a sheet of carbon paper between the acetate (on top) and the wood. Follow the pattern with a burnishing point to transfer a carbon image to the wood.

Parallel Spacer: *You can expand this tool's use by drilling holes into it for any distance you need (up to the tool's radius).*

Adjustable Triangle: *Get perfect results every time when you measure and transfer angles with this tool.*

Matte Acetate: *The pad in this kit contains 25 sheets (14x17") of .003-gauge material.*

HOW TO ORDER

The basic kit (mechanical pencil, $1.98; lead refills, 80¢; eraser, 60¢; adjustable triangle, $11; three french curves, $6.50; two circle templates, $8.45; protractor, $1.25; and parallel spacer, $2.50—list price of $33.08) is available to *WOOD* magazine readers for $27 ppd.

The deluxe kit (basic kit plus compass, $11; flexible curve, $6.50; and matte acetate, $13—list price of $63.58) is discounted for *WOOD* readers to $54 ppd. To order individual items, add 10 percent for shipping and handling.

Mail your check or money order (VISA and MasterCard also accepted) to the address below, and tell them *WOOD* magazine sent you. Items shipped via UPS.

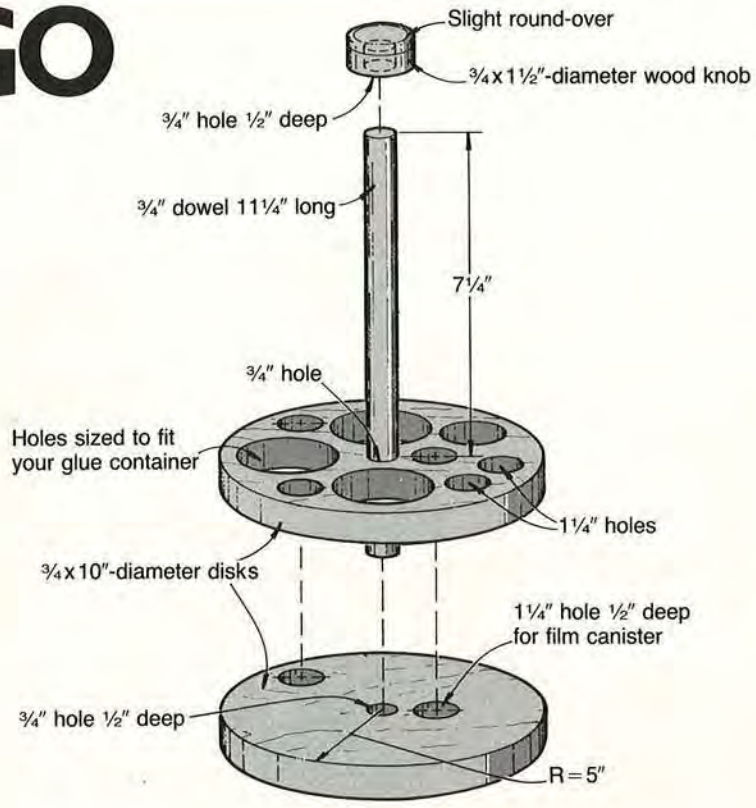
Standardblue Artworld
924 Grand Avenue
Des Moines, IA 50309
Phone: 515/288-1927

Written by Bill Krier
with James R. Downing
Photograph: Bob Calmer

Circle Templates: *The center lines on these tools make it easy to find the center of a dowel.*

Print this article

ON-THE-GO GLUE CADDY



Need to get your shop better organized? If so, there's no better place to start than by making our handy glue caddy. It's a cinch to build, and it won't even put a dent in your scrap pile.

FORMING THE DISKS

1 Cut two pieces of ¾" stock (we used a pine 1x12) to 11" square. If you don't have stock this wide, laminate narrower pieces.

2 Find the center of one of the squares by marking diagonals. Mark a 10"-diameter circle at the center.

3 Stick the two squares together, marked circle up, with double-faced tape. Cut the disks to shape.

4 Arrange your glue bottles and accessories on top of the disks. Trace around each container. (We added 35-mm film canisters for holding cotton swabs, brushes, and other items used to apply glue into those hard-to-get-at places. We also included a foam cup for soaking the glue brushes after each use.)

5 To prevent drilling into your drill press table, mount a piece of scrap material to it. Drill a ¾" hole through the center of both disks. Then, if you plan on using the film canisters as shown in the photograph, switch bits, and drill 1¼" holes through the first disk and ½" deep into the second (we used a Forstner bit). Separate the disks, and remove the tape.

6 With the 1¼" bit still chucked to your drill press, drill holes through the top disk for additional film canisters. Now, using a circle cutter or hole saw, bore the larger holes as shown in the photo at *right*. Bore through the top disk and just a fraction into the scrap top mounted to your drill press table. Sand both disks and the openings smooth.

FINISHING UP

1 Cut a piece of ¾" dowel stock 11¼" long for the handle.

2 Slide the top disk onto the ¾" dowel, and position its top face 7¼" down from the top end of the dowel. Mark the position of the disk (top and bottom) on the dowel. Slide the disk away from the marked area, and apply glue between the marked lines on the dowel. Now, slide the disk back onto the glued area, turn it upside down, and run a small bead of glue around the dowel below the top disk. Later, after the top disk is firmly glued in place, glue the dowel into the ¾" hole in the base disk, aligning the holes in the disks.

We used a circle cutter for cutting the larger-diameter holes.

3 Mark a 1½" circle on a piece of ¾" stock for the knob. Bore a ¾" hole ½" deep at the center point. Cut the knob to shape on a band saw, sand smooth, and glue it to the top end of the dowel. Apply a clear finish to all the parts.

Project Design: Jim Boelling
Photographs: Bob Calmer
Illustrations: Kim Downing; Bill Zaun

LOOK AHEAD TO THE HOLIDAY SEASON

This year, take a tip from these busy little elves. Start building your gifts now, and you'll be done in plenty of time to enjoy your family and friends when they come calling. Here are six people-pleasing projects to get you going.

ROLL OUT THE WHEEL

Print this article

Children have carted everything from sand to dollies in our wee wheelbarrow. In fact, kids don't even mind picking up their playthings when they can push toys back to the toybox in this pint-sized hauler. Grown-ups have found this an excellent display for potted plants, too.

***Note:** If you plan to use the wheelbarrow outdoors, we recommend using a slow-set epoxy and an exterior paint for durability.*

BUILD THE FRAME AND BOX

1 Rip and crosscut two pieces of ¾"-thick pine to 2½×23½" for the handles (A). Stick the handles together face to face with double-faced tape, keeping the edges and ends flush. Using the dimensions on the Handle Drawing *below,* lay out the handle outline on one of the pieces. Cut and drum-sand the handles to shape. Separate the two handles and remove the tape.

2 Cut a piece of ¾"-thick pine 7½" wide by at least 12" long for the leg brace (B). Tilt your table saw blade 10° from center, and bevel-rip both side edges of the leg brace. Crosscut the leg brace to finished length (7½"). Rout a ¼" round-over along the bottom edge of the brace.

3 Using the dimensions on the Leg Brace Drawing, mark the location of the U-shaped opening and handle notches. Cut the opening to shape. To cut the angled notches, mark a line for the notch width (¾") and length (2½"). Align a sliding T-bevel against the 10° bevel cut earlier. As shown in the photo *below*, use a T-bevel to mark the angle of each notch. Clamp the leg brace in a vise. Cut the notches to shape with a handsaw.

4 Cut the front brace (C) to size, bevel-cutting the ends at 10°. Glue and nail the frame together, using the dimensions on the Exploded-View Drawing to locate the braces.

5 Cut the box bottom (D), front (E), and sides (F) to size. Lay out the 2" radius on the back upper corner of each side piece, and cut both pieces to shape. Glue and nail the box together.

6 Glue and nail the box to the frame, checking that the back edge of the box is flush with the back edge of the leg brace and centered from side to side on the handles.

7 Set the nails, fill the nail holes with putty, and sand smooth.

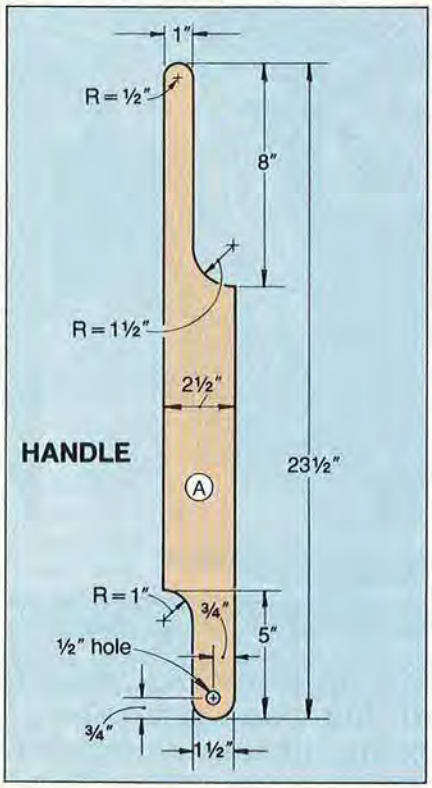
FORM AND FIT THE WHEEL

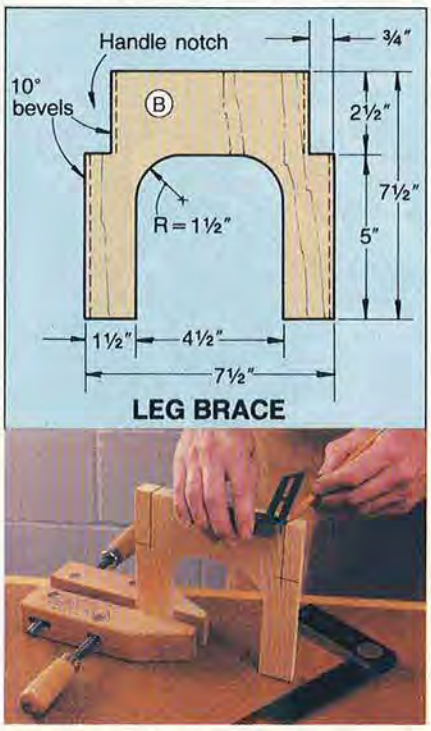
1 To make the wheel (G), cut a 7×7" square from ¾" pine stock. Mark diagonals to find center. With a compass, mark a 6"-diameter circle on the stock. Now, using a band saw or jigsaw, cut slightly outside the marked outline, and then sand to the line for finished shape.

2 Rout a ¼" round-over along both of the wheel edges. Bore a 9/16" axle through the wheel center. Cut a ½" dowel 2" long for the axle.

3 To minimize chip-out, position a piece of scrap between the handles, and drill the ½" axle hole through the handles where located on the Handle Drawing.

4 To enlarge the wheel opening between the handle, position a piece of ¾"-thick stock against the front of the box and centered between the handles as shown *below.*





Mark the angled notches on top of the leg brace with a sliding T-bevel.

Mark the wheel opening on the top edge of the handle fronts.

BARROW OF FUN

Mark the wheel opening onto the handle tops.

5 Using a handsaw, cut the handle fronts where marked to allow wheel clearance. Slip a sanding belt over the ¾" scrap, and sand between the handle ends as shown *below*. Sand until the wheel and two flat washers fit loosely in the opening.

After cutting, hand-sand the opening to accommodate the washers and wheel.

6 Finish-sand, and apply a coat of sanding sealer to all the parts. Then, paint or stain as desired.

7 Later, position the wheel (G) and washers between the handle ends, and nail the axle in place.

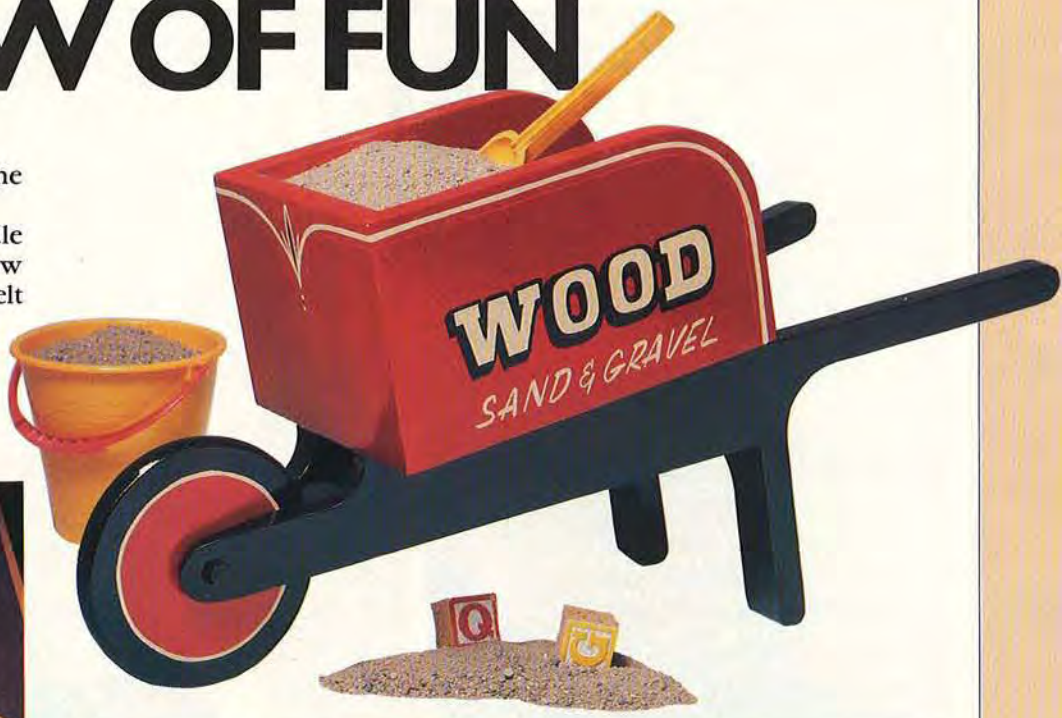
Project Design: Dave Ashe
Photographs: Bob Calmer, Hopkins Associates
Illustrations: Kim Downing, Bill Zaun

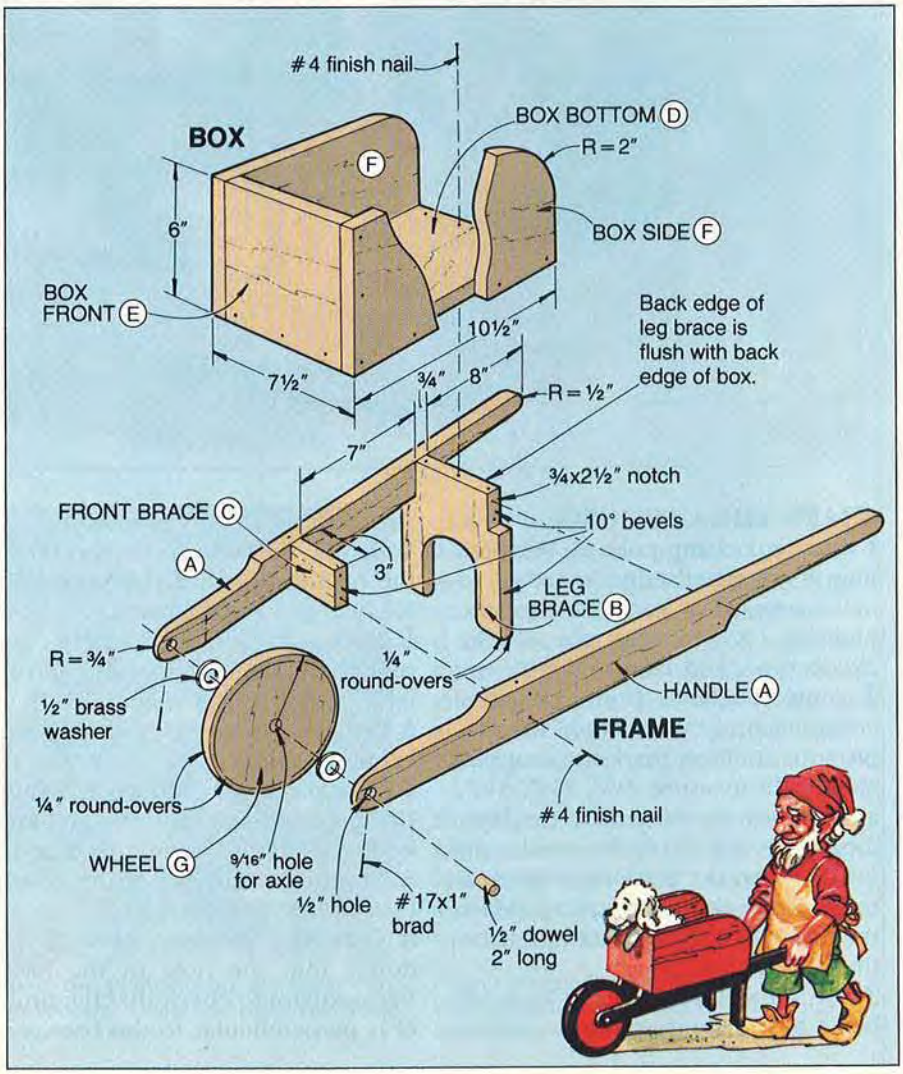
Bill of Materials

Part	Finished Size*			Material	Qty.
	T	W	L		
A	¾"	2½"	23½"	pine	2
B*	¾"	7½"	7½"	pine	1
C	¾"	2½"	3"	pine	1
D	¾"	6"	9¾"	pine	1
E	¾"	6"	6"	pine	1
F	¾"	6"	10½"	pine	2
G*	¾"	6" diameter		pine	1

*Parts marked with an * are cut larger initially, and then trimmed to finished size. Read the instructions before cutting.

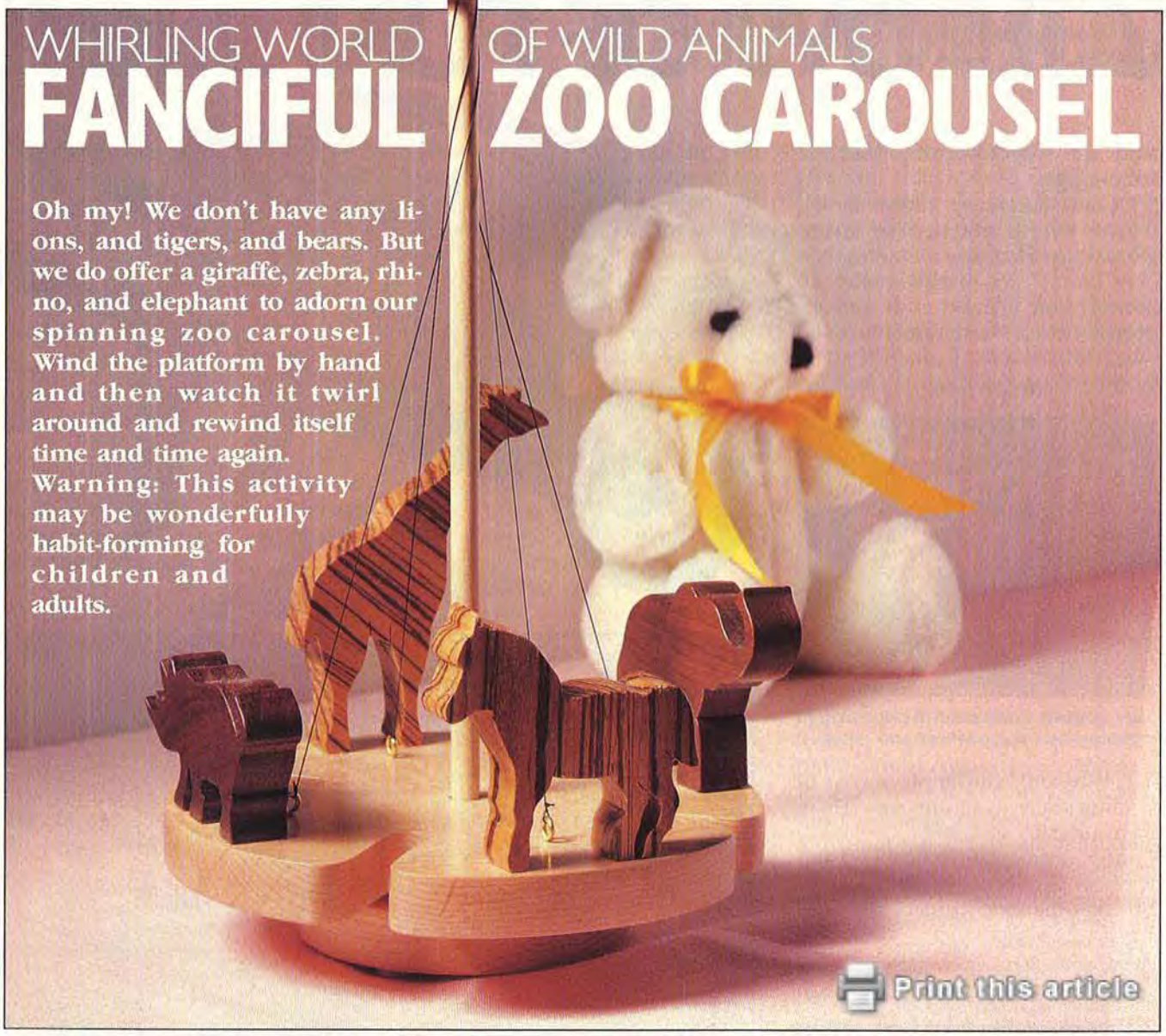
Supplies: double-faced tape, #4 finish nails, ½" dowel, two ½" brass flat washers, #17x1" brad, wood putty, glue or slow-set epoxy, stain or paint.





WHIRLING WORLD OF WILD ANIMALS
FANCIFUL ZOO CAROUSEL

Oh my! We don't have any lions, and tigers, and bears. But we do offer a giraffe, zebra, rhino, and elephant to adorn our spinning zoo carousel. Wind the platform by hand and then watch it twirl around and rewind itself time and time again. Warning: This activity may be wonderfully habit-forming for children and adults.



SHAPE THE CAROUSEL

1 Glue and clamp enough ¾"-thick maple together edge to edge to make a board at least 9×9" for the platform (A). Later, scrape off the excess glue, and trim to 9×9".

2 Draw diagonals from corner to corner to find the center of the maple square. Then, mark the four circles (radii measure 2¼", 2½", 3¼", and 4") where shown on the Platform Drawing. Mark the small radii (¼", ¾") on the platform where dimensioned on the drawing. Mark the four screw eye center points on the 2½" radius.

3 Use a band saw fitted with a ⅛" blade to cut the platform to shape. Drum-sand the curves smooth.

4 Drill a 7⁄16" hole in the center of the platform. Drill a 1⁄16" pilot hole ⅜" deep for each screw eye.

5 Mark a 4½"-diameter circle on a piece of ¾"-thick maple for the base (B). Cut it to shape.

6 Drill a ⅜" hole ½" deep into the center of the base.

7 Cut a piece of ⅜" dowel 12" long. Using a band saw, cut two 1⁄16" saw kerfs ¼" deep, perpendicular to each other in the end of the dowel (see the Dowel Detail).

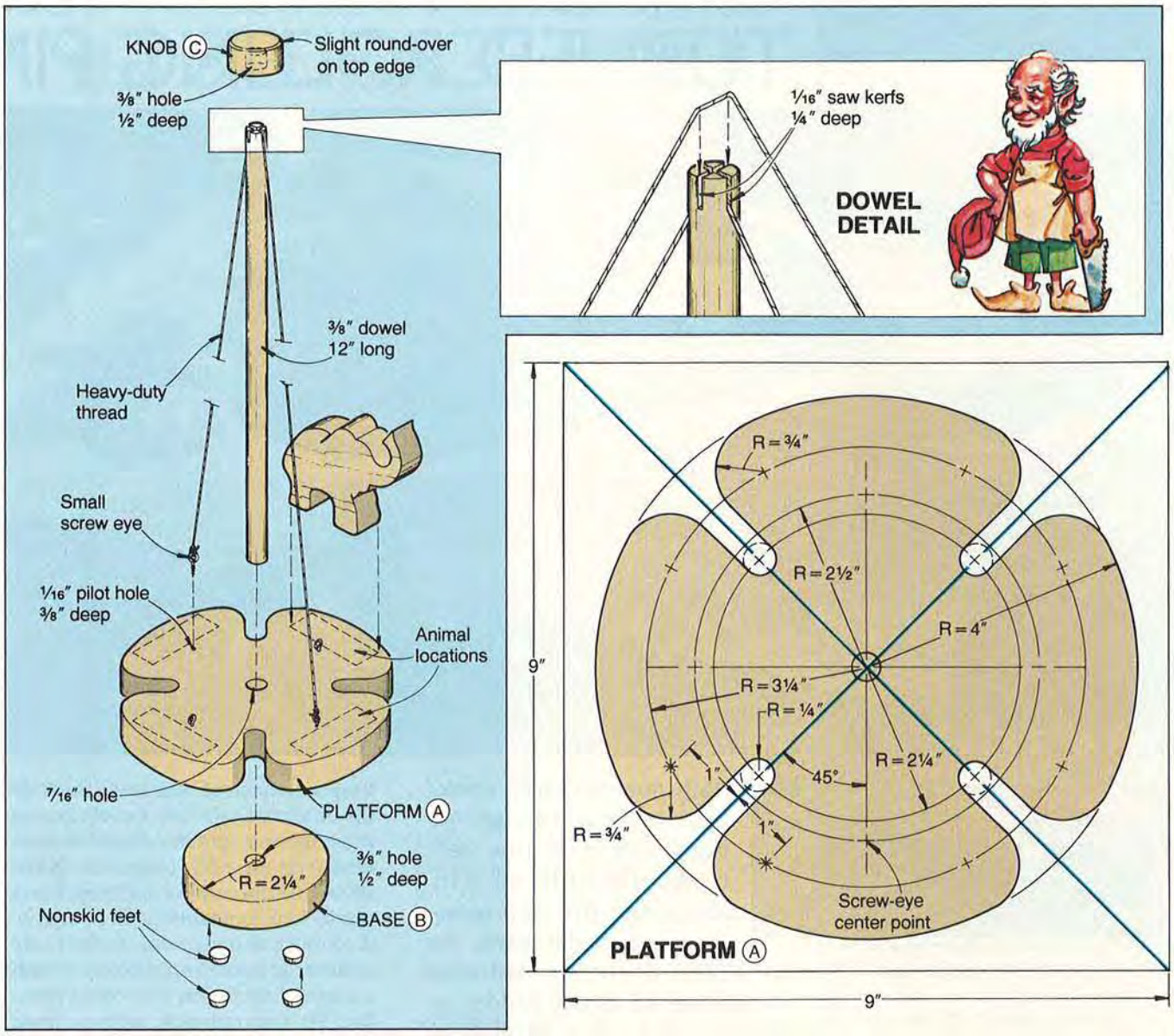
8 Glue the unkerfed end of the dowel into the hole in the base. Use a square to check that the dowel is perpendicular to the base.

9 To make the knob (C), mark a 1"-diameter circle on a piece of ¾"-thick maple. Drill a ⅜" hole ½" deep at the center of the marked circle. Now, cut the circle to shape. Sand a slight round-over along the top edge of the knob.

AND NOW, THE ANIMALS

1 Using tracing paper, transfer the full-sized animal patterns on page 91 to ¾"-thick stock, noting the grain direction on the patterns. (We used walnut for the elephant and rhino, and zebrawood for the zebra and giraffe for contrast.)

2 Cut the animals to shape. Sand the band-sawed animal edges.



FINAL ASSEMBLY

1 Sand all parts of the project. Mix and place a dab of epoxy on the bottom of the feet of all the animals. Position the animals on the platform, and let the epoxy cure.

2 Apply self-adhesive rubber or cork feet (also called bumpers) to the bottom of the base to prevent the base from slipping when the platform is wound up. Apply finish.

3 Position two ¼"-thick spacers on the top of the base, and slide the platform down the dowel onto the spacers. Using heavy-duty thread, tie the thread to one screw eye. Pull the thread through a saw kerf in the top of the dowel, snug it up, and tie it to the opposite screw eye. As shown in the photo at *left,* repeat for the second thread, keeping an equal tension on both threads.

4 Remove the spacers, and add the knob to the top of the dowel. Rotate the platform several revolutions and let it twirl. After you're done playing with it, call the kids.

Support the platform on the base with scrap spacers. Hang the platform from the center dowel.

Supplies: 4-small screw eyes (we used Stanely 8450-212 1/2 eyes, 1 3/16" long with a 3/16" inside eye diameter), heavy-duty thread or nylon fishing line, nonskid feet.

Project Design: William Warrick
Photographs: Bob Calmer, Jim Kascoutas
Illustrations: Kim Downing, Bill Zaun

Print this article

YOU'LL BE ROLLIN' IN THE DOUGH WITH OUR

TURNED ROLLING PIN

Roll out pastries, cookies, or bread dough in high style with this hefty maple rolling pin adorned with easy-rotating walnut handles. As an added bonus, build our wall-mounted maple holder to display your lathe skills and keep the rolling pin within arm's reach.

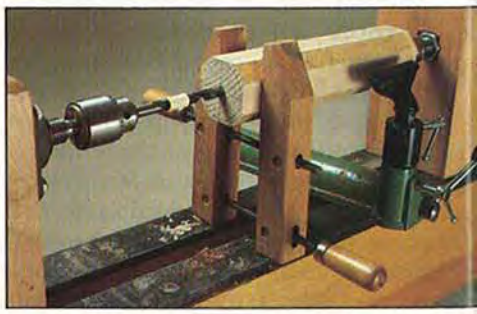
Note: You'll need thick stock to make this project. You can either laminate thinner stock to the sizes listed in the Bill of Materials or use the Buying Guide on page 76. We've called the folks at Constantine's, and they've put together a rolling-pin kit for you.

ROUGH-SHAPE THE BARREL

1 Cut a 3x3" maple turning square to 11½" long for the barrel (A).

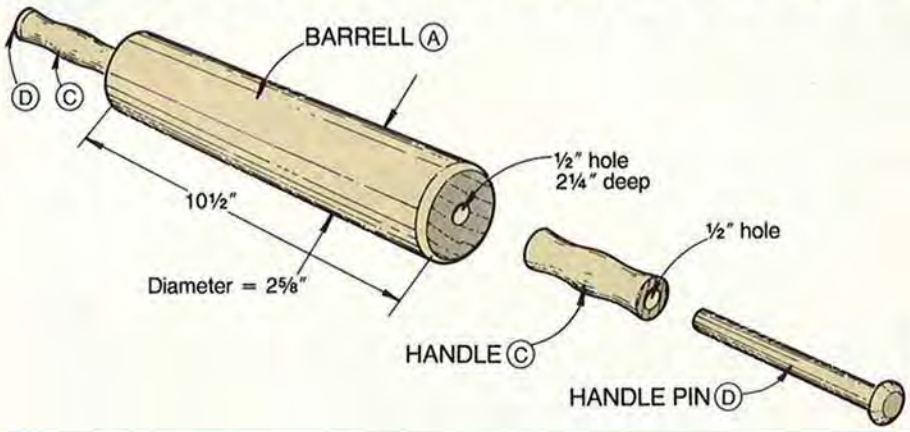
2 Mark diagonals on each end of the barrel to locate centers. On *one* end, draw a 2¾"-diameter circle. Remove most of the stock *outside* the marked circle by bevel-ripping the edges using a table saw with its blade set at 45°. (Use the circle drawn on the end of the barrel as a guide when trimming the waste.)

3 Remove the spur center from the lathe headstock, and replace it with a chuck fitted with a ½" brad-point bit. Fit the tailstock with a cone center. Move the tailstock next to the barrel, and align the marked center point on the end of the barrel with the brad-point bit. Using a handscrew clamp, clamp the barrel level as shown *below*.



Drill a ½" hole 2½" deep centered in each end of the maple barrel.

AND STORAGE RACK

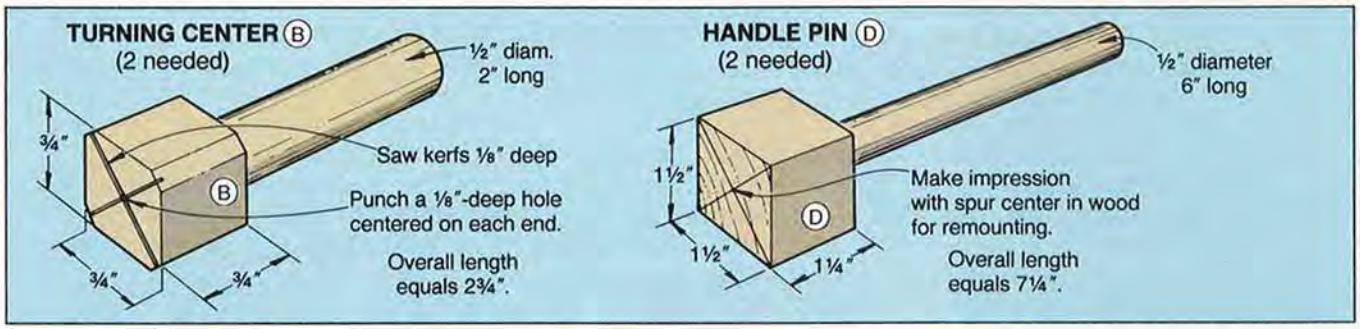


Bill of Materials

Part	Finished Size* T	W	L	Materials	Qty.
ROLLING PIN					
A*	2⅝" diam.		10½"	maple	1
B	¾"	¾"	2¾"	hardwood	2
C*	1⅛" diam.		4"	walnut	2
D*	1⅛" diam.		6¼"	maple	2
STORAGE RACK					
E	¾"	2⅝"	18"	maple	1
F	¾"	2⅝"	3¼"	maple	2

*Parts marked with an * are cut larger initially, and then trimmed to finished size. Please read the instructions before cutting.

Supplies: nontoxic finish.



4 With the lathe set at its slowest speed, drill a 2½"-deep hole in the barrel. You'll need to turn the lathe off periodically, remove the shavings, and then resume drilling. (We wrapped tape on the bit to ensure drilling to an accurate depth.) Turn the barrel-clamp assembly around, and fit the hole just drilled onto the cone center. Check that the bit aligns with the marked center point, and drill a second 2½"-deep hole. Set the barrel aside for now.

MAKE 2 TURNING CENTERS

1 Cut two pieces of ¾" hardwood to ¾" square by 2¾" long for the turning centers (B). Mark diagonals on both ends of each piece to locate centers. On *one* end of each turning center, cut kerfs ⅛" deep along each marked diagonal with a hand saw. Punch a hole about ⅛" deep in the center of each end of each turning center with an awl or center punch.

2 Mount one of the turning centers between centers on the lathe, and turn the stock to the shape and size shown on the Turning Center Drawing. Now, sand the shank portion of the turning center to ½", checking the diameter often with an outside caliper to make sure you end up with a snug fit in the ½" hole in the barrel. Repeat for the second turning center.

FINISH-TURNING THE MAPLE BARREL

1 Push the turning centers into the holes in the barrel. Mount the assembly between centers. Start the lathe, and turn the barrel to a cylinder 2⅝" in diameter.

2 Trim each end of the barrel with a parting tool for a finished-barrel length of 10½". Be careful to stop the cut once the parting tool makes contact with the turning center.

3 Using a sanding block, sand the barrel to remove any waviness. Sand the ends smooth, sanding a slight round-over on the corners.

4 Apply a liberal coat of cooking oil to the barrel, and let the oil soak in for a few minutes. Wipe off any excess oil with a clean rag. Turn your lathe on, and polish the barrel to a high luster by holding a clean white rag against the wood. Repeat with a second coat of oil.

SHAPE THE WALNUT HANDLES AND MAPLE PINS

1 Cut two pieces of 1½"-thick walnut to 1½" wide by 4⅛" long for the handles (C). Mark diagonals on each end of each handle to locate centers. Clamp one of the handle blanks in a handscrew clamp. Check that the handle blank is square with the drill press table. Then, center and drill a ½" hole through the length of each handle. (To keep the bit from wandering, we used a brad-point bit.)

2 Cut two pieces of 1½"-thick maple to 1½" wide by 7¼" long for the pin blanks (D).

3 Mount one of the pin blanks between centers, and mark a reference line 1¼" from the headstock end. Turn the pin to the shape shown *above*. Spot-glue one of the handle blanks onto a handle pin (we used hot-melt glue).

Continued

ROLLING PIN AND STORAGE RACK

4 Mount the handle and pin assembly between centers using the marks on the drive center and pin to locate their original position. Turn the handle to the shape shown on the Handle Drawing *below.* True up the end of the handle nearest the tailstock. Sand the handle, and apply an oil finish.

5 Separate the handle from the pin by cutting the glue joint with your parting tool. Stop the cut as soon as you cut through the walnut.

6 Remove the handle from the pin and remount the handle pin between centers. Sand the handle-pin shaft so the handle will turn easily on the pin shaft. (We stopped the lathe several times to check the fit of the handle on the handle pin.) Shape the end of the handle pin where shown on the Exploded-View and Handle drawings.

7 Place the handle on the pin, and remount them between centers. Sand the head of the pin to the same diameter as the end of the handle (see the Handle Drawing). Finally, use your skew to cut the pin free. Sand the rounded end of the pin smooth.

FINAL ASSEMBLY

1 Apply oil to the inside of the hole in each handle (C) and to the ends of the handle. Apply oil to all but the 2" of the pin (D) that will be glued into the barrel.

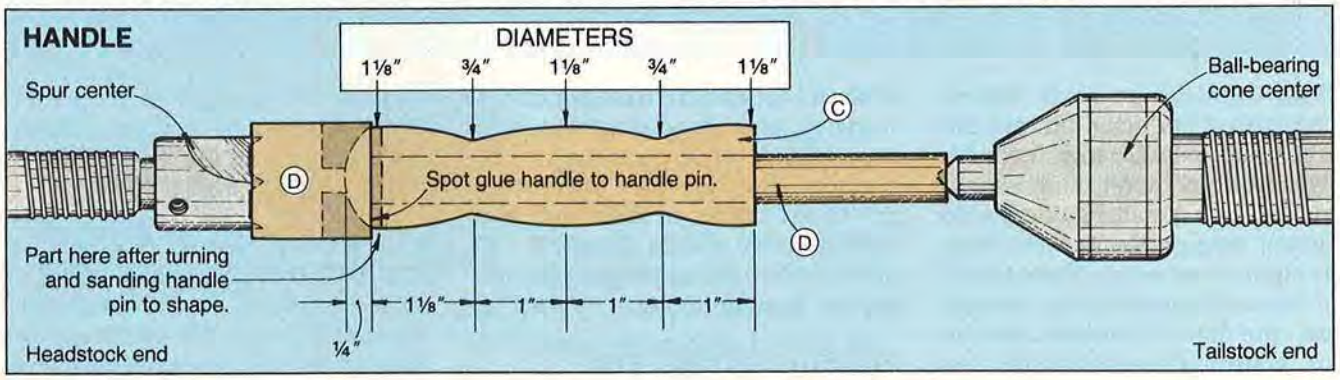
2 Spread a light coat of glue in the holes in the barrel (we used a cotton swab). Slip the handles on the pins, and carefully tap the pins in place, leaving just enough play for the handles to turn freely. Immediately back out slightly if too tight.

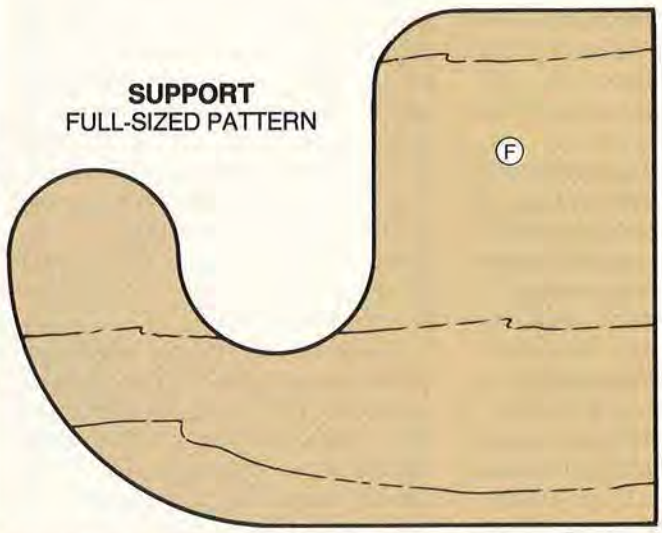
BUILDING THE MAPLE STORAGE RACK

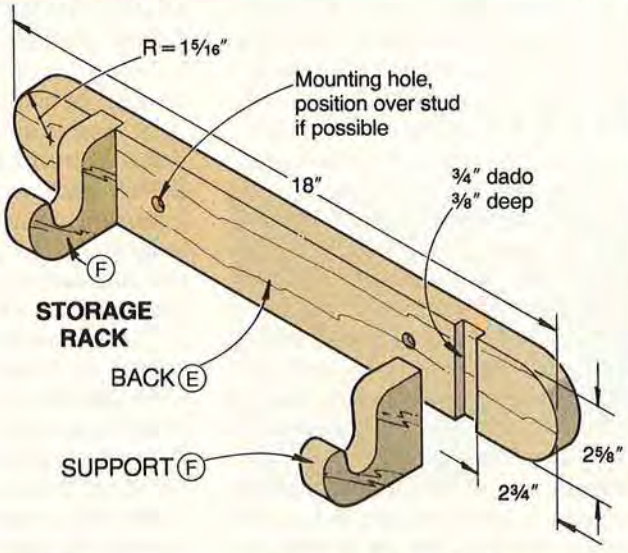
We were so impressed with the good looks of the rolling pin, we decided to add a wall-mounted storage rack. To make the maple rack, cut the back (E) and supports (F) to the sizes listed in the Bill of Materials. Mark the radii on the back piece, and cut it to shape. Now, mark the location, cut two dadoes, and drill the holes in the back where shown on the Storage Rack Drawing *below.* Use carbon paper to transfer the full-sized pattern onto the two support pieces (F). Cut the supports to shape, sand smooth, and glue them into the dadoes. Finish-sand, apply the finish, and hang.

BUYING GUIDE

● **Rolling pin kit.** 1½x1½x12" walnut, 3 × 3 × 12" maple, 1½x1½x18" maple. Kit no. WD988, $10.50 ppd.. Constantine's, 2050 Eastchester Rd., Bronx, NY 10461. To order, call 800-223-8087 (800-822-1202 in New York).





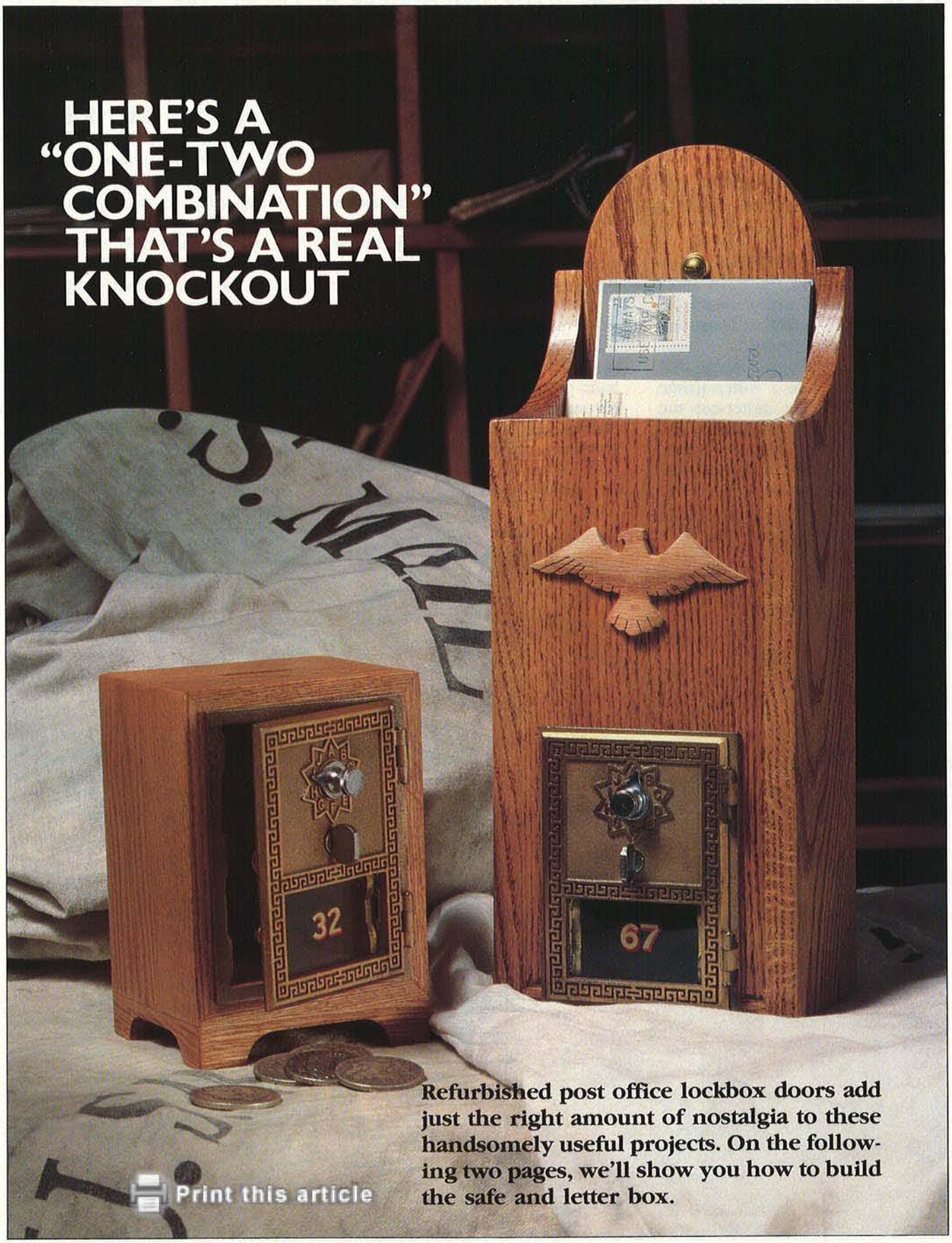


Project Design: Walt Becker

Photographs: Hopkins Associates

Illustrations: Mike Henry, Bill Zaun

HERE'S A "ONE-TWO COMBINATION" THAT'S A REAL KNOCKOUT



Refurbished post office lockbox doors add just the right amount of nostalgia to these handsomely useful projects. On the following two pages, we'll show you how to build the safe and letter box.

Print this article

THE MINI SAFE A PROJECT YOU CAN BANK ON

Kids will love saving for tomorrow in an oak safe highlighting one of yesteryear's treasures—a genuine brass lockbox door. The restored brass door—salvaged from one of America's post offices—comes complete with a working combination.

FIRST, MAKE A BASIC BOX

1 Cut a piece of ½"-thick oak to 4" wide by 24" long. Cut or rout a ¼" groove ¼" deep and ¼" from one edge of the oak strip.

2 Tilt your table saw blade 45° from center. Using a miter gauge fitted with a fence, miter-cut the sides (A) and top and bottom (B) to length from the 24"-long strip

3 Using the dimensions on the drawing, mark the slot on the top face of the top piece (B). Drill a ¼" hole at each end of the slot. Using a 3/16" bit, drill out the waste material between the two ¼" holes. Then, chisel the slot to shape, or cut it to shape with a scroll saw.

4 Cut the box back (C) to size from ¼" oak or lauan plywood.

5 Glue and clamp the box assembly together. (We used masking tape to hold the mitered joints together, and then pulled the joints tight with a band clamp.)

ADD A BASE

1 Cut a piece of ½"-thick oak to ¾" wide by 24" long. Miter-cut the base pieces (D, E) to length from the strip. Mark the opening on the four pieces to form the feet where shown on the drawing *below.*

2 Cut the base pieces to shape. (We cut ours on a band saw fitted with a ⅛" blade.) Sand the rounded corners smooth with a 1"-diameter drum sander.

PUTTING IT ALL TOGETHER

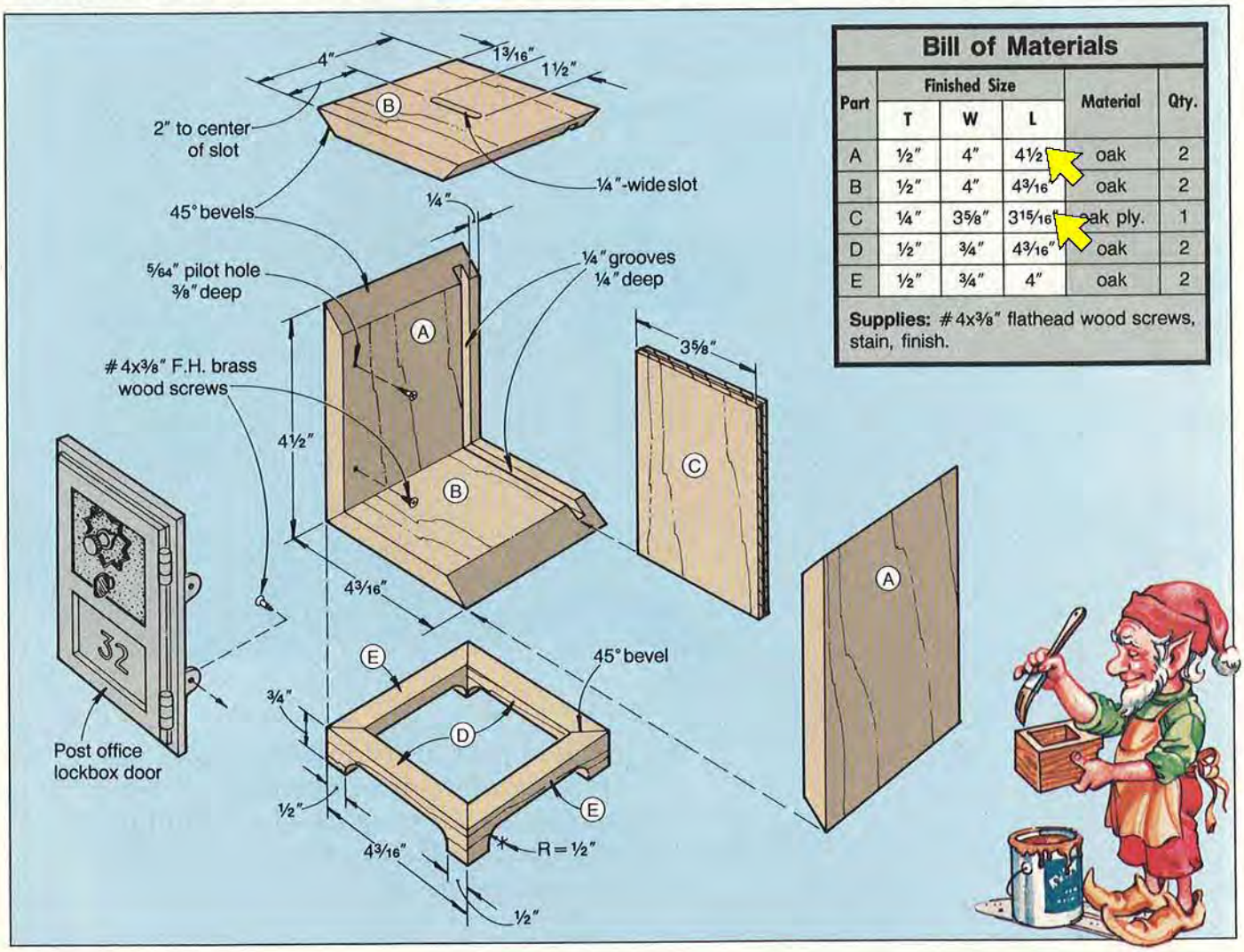
1 Glue and clamp the base pieces to the bottom of the box.

2 Position the door and drill ⅜"-deep holes in the opening. The holes will be slightly angled.

3 Sand the assembly smooth. Stain and finish as desired. Screw the door in place. Then, empty your pocket change into the bank.

BUYING GUIDE

• **Post office lockbox door.** Grecian style with two-digit decal. Reconditioned doors shipped with three-letter combination. $19 ppd. for one door, $36 ppd. for two. Streeter Company, P.O. Box 241, Sturgeon, MO 65284.



Bill of Materials

Part	Finished Size T	W	L	Material	Qty.
A	½"	4"	4½"	oak	2
B	½"	4"	4 3/16"	oak	2
C	¼"	3⅝"	3 15/16"	oak ply.	1
D	½"	¾"	4 3/16"	oak	2
E	½"	¾"	4"	oak	2

Supplies: #4x3/8" flathead wood screws, stain, finish.

BILL BOX AND KEY KEEPER THE RIGHT COMBINATION

Staying organized in this day and age isn't easy. But with this project, you'll at least know the whereabouts of those ever-present bills, and be able to keep track of otherwise-elusive car keys that always seem to wander off.

Note: See the Buying Guide on the opposite page for our source of refurbished lockbox doors.

CUT AND ASSEMBLE THE LETTER BOX

1 Rip and crosscut the back (A), front (B), two sides (C), shelf (D), and bottom (E) to the sizes listed in the Bill of Materials.

2 Mark, cut, and a 2¼" radius on the top of the back piece. Rout a ⅜" round-over on the top back edge of the front piece.

3 Using a try square, mark the door-opening location on the front piece, and cut it to shape. Check the fit of the door in the opening.

4 Using double-faced tape, fasten the two side pieces (C) together face to face with the edges flush. Mark a 2¾" radius on one piece where dimensioned on the drawing, and cut and sand both pieces to shape. Remove the tape.

5 Mark the location, and cut a ½" rabbet ¼" deep along the bottom edge of the back (A). Using the dimensions on the drawing, mark the locations and cut a ½" dado ¼" deep in the front and back pieces. Check the fit of the shelf and bottom in the dadoes and rabbet.

6 Mark the location and drill pilot holes for the two cup hooks and two mounting holes for attaching the box to the wall after assembly.

7 With the bottom edges of the sides and back flush, glue and clamp them together. (We positioned the shelf and bottom in place to hold the assembly square.) Glue and clamp the shelf, bottom, and front to the assembly.

8 Transfer the eagle pattern *below* to ¼" oak stock, and cut it to shape. (We planed down a piece of ½" stock for the ¼"-thick eagle.)

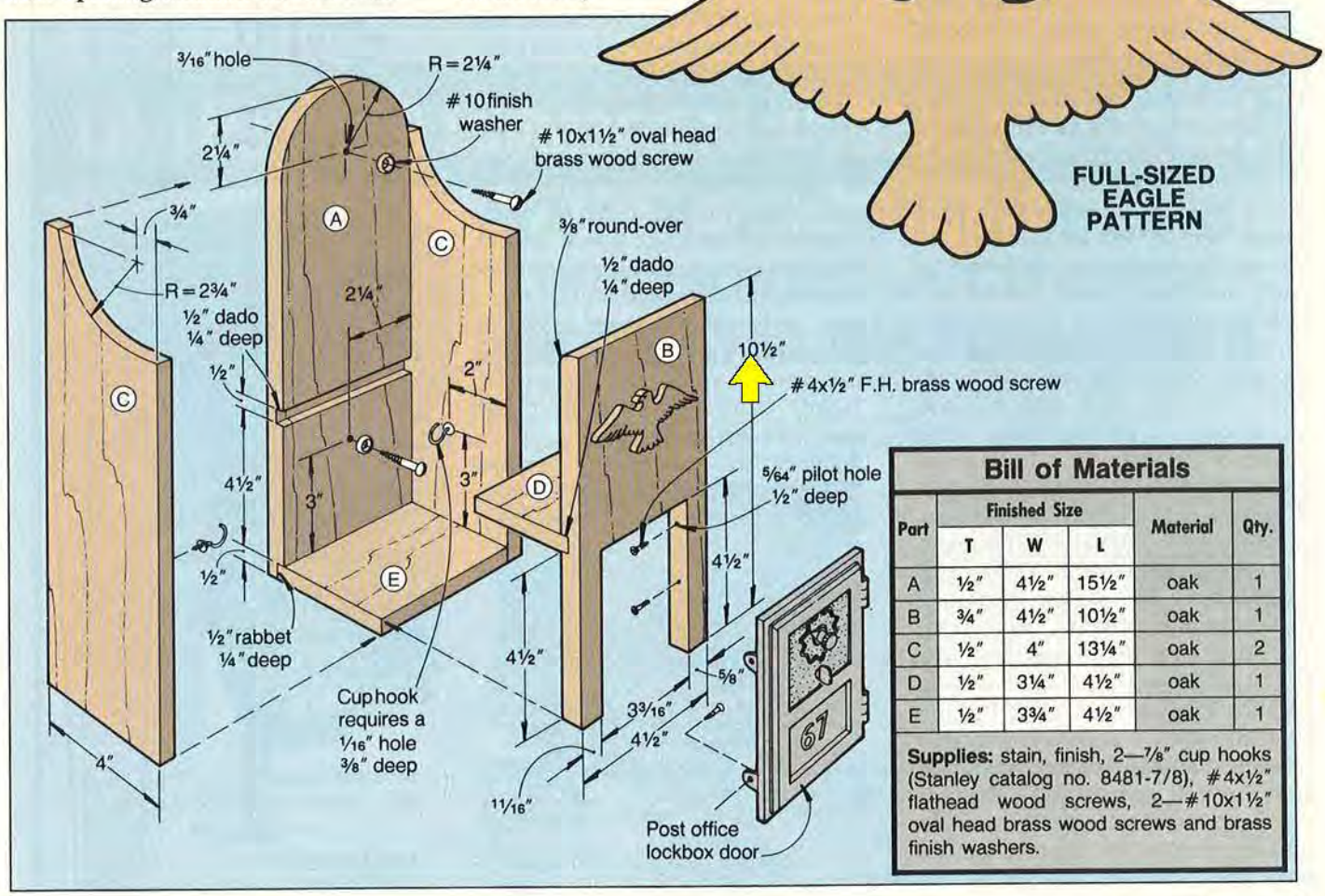
NOW, MOUNT THE DOOR AND ADD THE FINISH

1 Sand the box smooth. Hold the bronze door in place, and drill the angled pilot holes in the opening in the front piece. Remove the door.

2 Stain and finish the box. Mount the door and hang the box, centering it over a stud if possible.

***Note:** If you don't want to use the combination each time you open the door, remove the lock mechanism from the back of the door. Then, remount the dial.*

Project Design: Sam Criswell
Photographs: Jim Kascoutas
Illustrations: Kim Downing, Bill Zaun



Bill of Materials

Part	Finished Size T	W	L	Material	Qty.
A	½"	4½"	15½"	oak	1
B	¾"	4½"	10½"	oak	1
C	½"	4"	13¼"	oak	2
D	½"	3¼"	4½"	oak	1
E	½"	3¾"	4½"	oak	1

Supplies: stain, finish, 2—⅞" cup hooks (Stanley catalog no. 8481-7/8), #4x½" flathead wood screws, 2—#10x1½" oval head brass wood screws and brass finish washers.

Print this article

A FUN-TO-DO FREE-FORM WOOD SCULPTURE

HANDCRAFTED CATTAILS AND REEDS

If you're looking for a one-of-a-kind project, you just can't miss with these cattails and reeds. Strips of birch veneer and lengths of ½" and ⅛" dowel combine to make one interesting arrangement. Use it as a centerpiece or decorative accessory.

MAKING THE CATTAILS

Note: The number of cattails and reeds will depend upon the size of arrangement desired.

1 Cut 2"-long pieces from ½"-diameter dowel stock for the fruit spikes. You can use walnut dowel stock, or try birch and stain it later.

2 To drill the holes in the fruit spikes, use an awl to make an indentation centered on each end of each dowel segment. Drill a ½" hole ½" deep through a scrap piece of 2×4 stock. Insert a fruit spike in the hole, center it under a ⅛" brad-point drill bit, and drill ½" into each end of each spike. (We clamped the spike in a handscrew clamp to prevent it from turning.)

3 To round the ends of the spikes, hold a dowel segment at an angle against a belt or drum sander and rotate the spike. Adjust the angle and continue sanding. Repeat for the other end. Hand-sand smooth.

4 Cut ⅛" dowel stock to 9½" long for the stem and 1" long for the stem tip. Sand a point on one end of each stem tip. For easy insertion into the fruit spike, sand a chamfer on the bottom end of the stem tip and top end of the stem. Glue the stem parts into the fruit spikes.

SHAPING THE REEDS

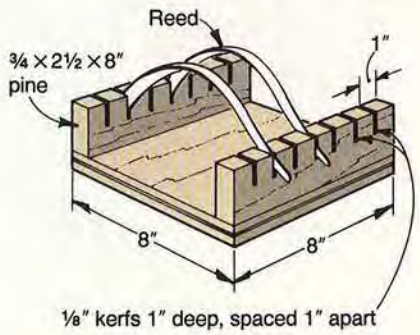
1 Cut ¾"-wide strips 10¼" long from birch veneer. (We used a utility knife to cut the 1/28" veneer.)

2 Hold 3 strips together face to face, and sand to shape (we used a belt sander clamped in a vise). See the full-sized reed pattern at *right*.

3 Immerse seven (that's all the jig will hold) of the reeds in water, and let them soak for 2 hours. While the reeds soak, construct the twisting jig shown *below*. One at a time, twist the wet strips into position in the jig as shown *below*. Let the veneer strips dry overnight. Lightly hand-sand each reed (we used 220-grit sandpaper).

4 Repeat the soaking and bending procedure with more strips, twisting them in the opposite direction so that the completed veneer reeds curve in different directions.

5 Leave the cattails and reeds unfinished or spray on a clear finish (we used Deft aerosal lacquer). For a more colorful effect, you might try painting the reeds with a light-green watercolor.



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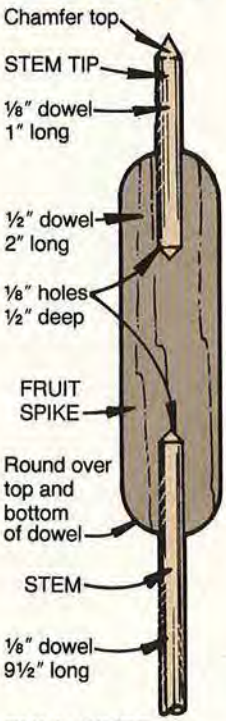
D. A. Callaway



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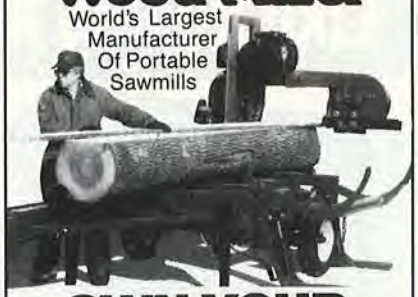

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—Steve Oswalt

(Steve Oswalt, a Des Moines woodworker, frequently contributes to WOOD magazine.)

Bosch Edge-Beading Router Bit, sold at hardware stores nationwide. The bit we tested, No. 85631M, carries a $28.25 suggested retail price.

FINISHING THE FUN AND EASY WAY

Woodsheen, a new Minwax product, applies easily and dries quickly in two hours as advertised—two points to consider in any finish.

Minwax bills the item as a "one-step finish." The gelled product combines a stain with a wax-like coat. However, the instructions clearly recommend two coats.

The squeeze bottle is a big plus for me—no lid to pry off and hammer back on—and the gel made the product easier to apply than a normal stain. The resulting finish has a nice sheen to it, but only after applying a second coat.

—Steve Oswalt

Woodsheen, a product of Minwax Co., available in six colors plus natural, at hardware and home supply stores nationwide. The 12-ounce bottle retails for $4.99.

Continued on page 84

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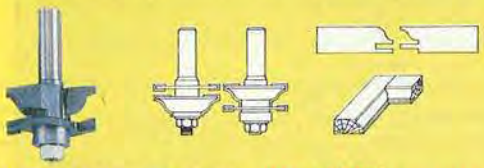

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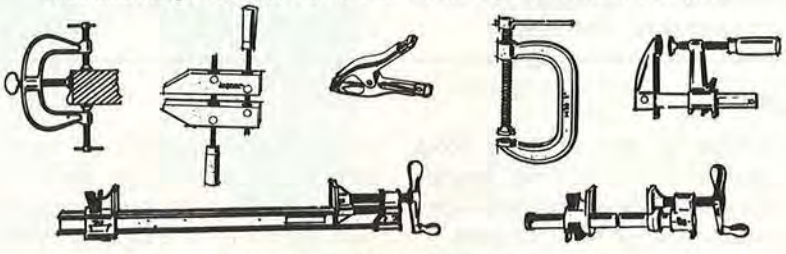

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Continued from page 83

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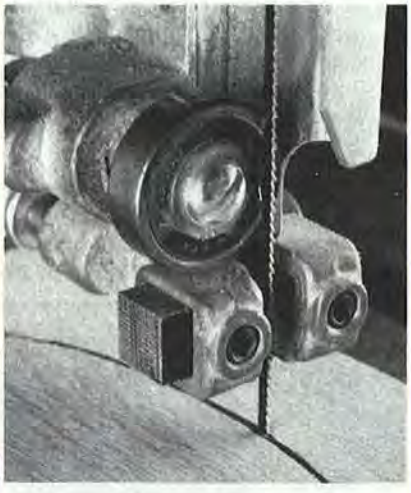

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The high-tech plastic also reduces blade friction, extends blade life, and dampens noise. Softening my saw's high-pitched whine made it easier to concentrate on critical cuts.

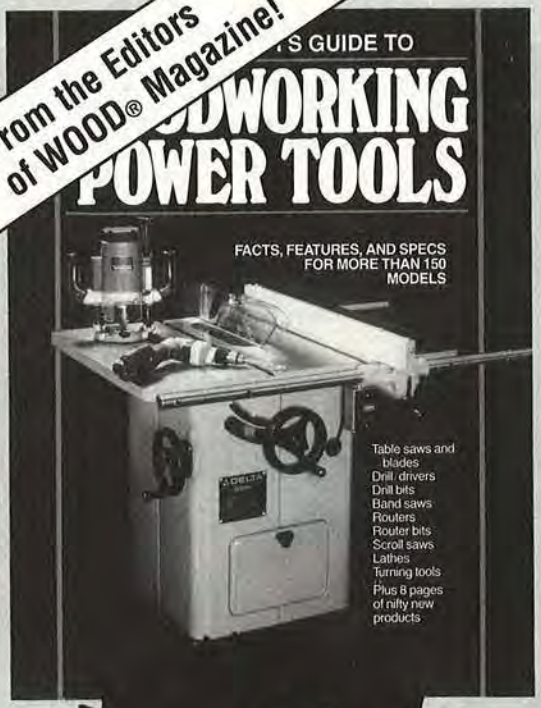
The guides appear to be durable. After 90 minutes of solid use, my Cool Blocks hardly showed any signs of use. When wear does occur, the manufacturer says they can be refaced with a file.

—Steve Oswalt

Cool Blocks come in sizes to fit most band saws; all cost $9.95 a set. The guides we tested were for a 14" Delta, order No. 33KO901, from Garrett Wade Company, the exclusive U.S. distributor. For more information write the company at 161 Avenue of the Americas, New York, NY 10013.

Continued on page 88

From the Editors of WOOD® Magazine!



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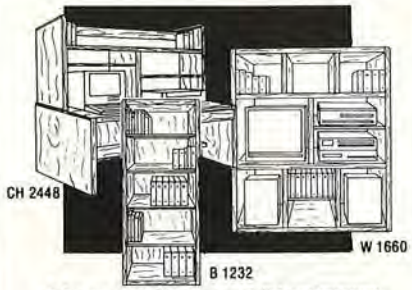

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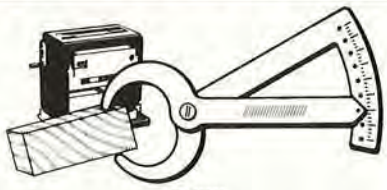

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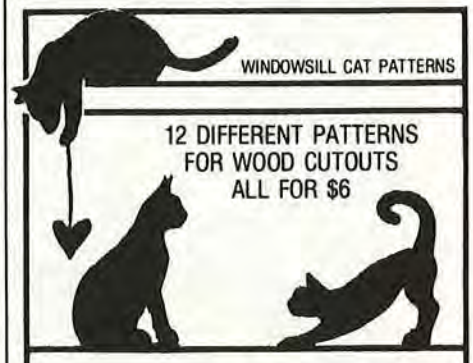

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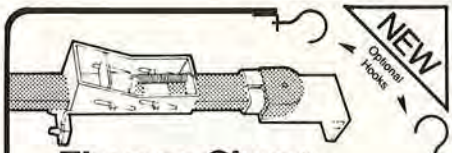

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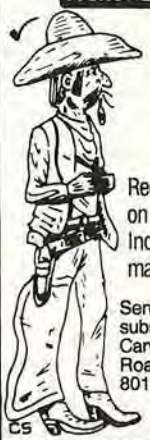

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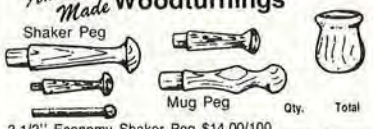

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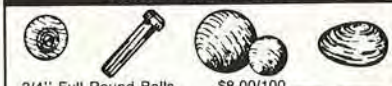

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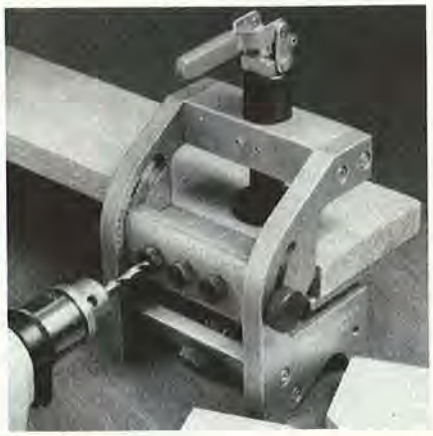
Continued from page 84

A DOWEL JIG WITH ALL THE ANGLES



This dowel jig rates as one of the most expensive and most versatile that I have come across. It not only looks nice and solid with excellent castings, it also adjusts easily and mounts firmly. The device's unequaled ability to enable drilling at angles from 0° to 45° is undoubtedly its strongest point.

The jig's quick-release toggle clamp adjusts simply and will easily apply 200 pounds pressure. A 3⁄32" rubber pad on the clamp prevents marring of the work piece. The jig mounts easily on a work bench or in a bench vise.

—Steve Oswalt

Kaufman's Dowel Jig, available in some hardware stores, retails for $129.95. For a list of distributors in your area, write to: Quality Craft Tool, 1703 East Monroe St., Goshen, IN 46526.

A PLANE TO RALI AROUND

I don't normally like woodworking tools made of plastic. But in this case, I'll make an exception.

The molded plastic handles of the Swiss-made Rali plane provide good leverage and feel comfortable. The plane stakes its fame on its replaceable blade, but I liked the depth adjustment even more. A flick with an index finger moves the single lever that adjusts blade depth. Once set, the blade—factory sharpened on two sides—did not slip. Because of the holding mechanism, I never needed to worry if the cutting edge was parallel.

—Steve Oswalt

The Rali 220 replaceable-blade plane can be ordered direct from H. Hirschmann Ltd., Oxbow Rd., Pittsford, VT 05763 for $81.16 ppd. Replacement blades sell for $2.20 each or $19 for a pack of 10.

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Altering the lathe speed changes the rigidity of the buffing wheel. One caution: Do not use the wheel on raw wood.

—Marlen Kemmet

The Arbor buffing wheel kit, including arbor unit, buffing wheel and compound bar (No. AB110); $29.95 ppd. from Craft Supplies, 1287 E 1120 S, Provo, UT 84601.

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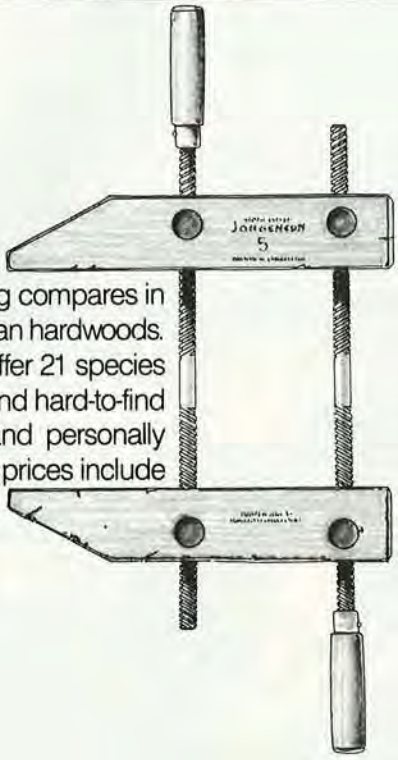

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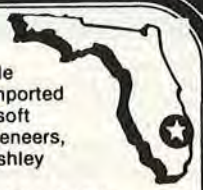

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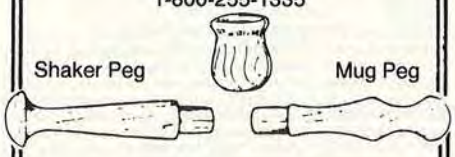
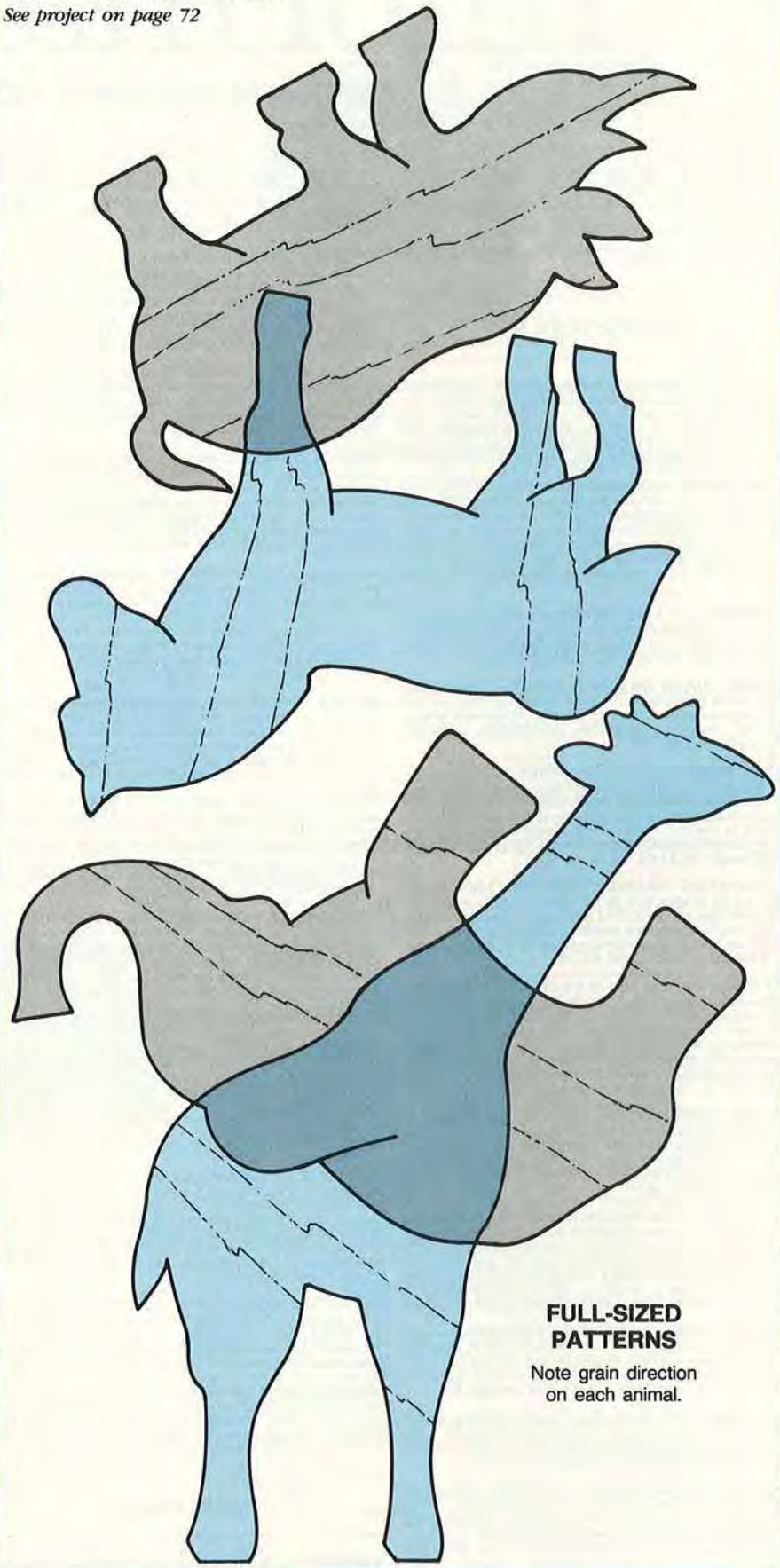


ZOO CAROUSEL

See project on page 72



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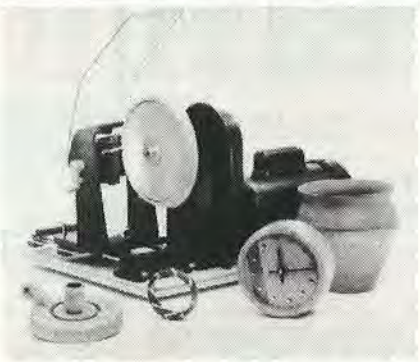

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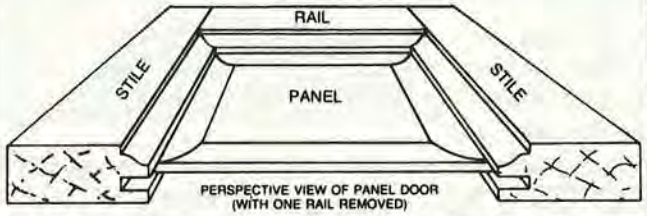

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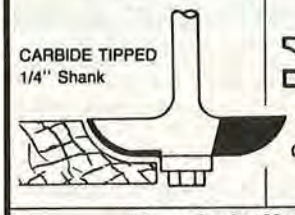

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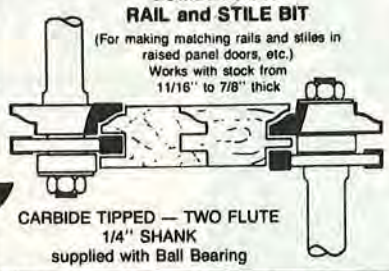

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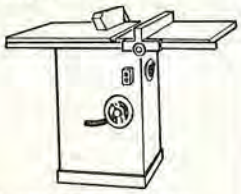

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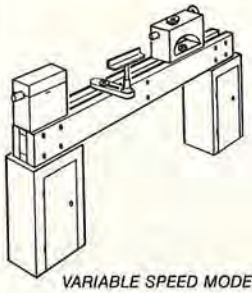

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RYOBI TOOLS

		List	Sale
B01825RK	⅜" Cordless 9.6v w/case	234	115
3500A	3"x5⅓" Finish Sanders	70	40
AP10	10" Surface Planer	820	398
SU6200	½ Sheet Finish Sander	210	130
B7075K	3"x21" Belt Sand. w/bag/cse.	237	130
B7100	3"x24" Belt Sand. w/bag	281	150
B7200	4"x24" Belt Sand. w/bag	351	189
W640	7¼" 13 amp Circular Saw	210	117
TS380	14" Mitre Box	773	385
RA200	8¼" Radial Saw	515	285
TS251U	10" Mitre Saw	392	188
JSE60	V/Speed Jig Saw	234	128
RA2500	10" Radial Arm Saw	679	392
TR30U	Laminate Trimmer	153	90
R150K	1 H.P. Plng. Router w/case	206	119
R230	1½ H.P. Router	257	165
R331	2 H.P. D-Handle Router	304	189
R500	2¼ H.P. Plunge Router	326	177
L120UK	3⅛" Planer w/case	206	119
L580A	6¼" Planer 10.5 amp	548	298
S600A	¼ Sheet Finish Sander	88	59

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TS200—8¼" Compound Mitre Saw
List 299 Special Sale 149

RE600—3 H.P. V/Spd. Plunge Router
List 398 Special Sale 198

BE321—3"x21" V/Spd. Belt Sander
List 259 Special Sale 119

MILWAUKEE TOOLS

PRICE BUSTERS		List	Sale
0224-1	⅜" drill 4.5A magnum	179	105
0234-1	½" drill 4.5A magnum	189	105
0244-1	½" drill 4.5A magnum	189	105
0222-1	⅜" drill 3.3A 0-1000 rpm	159	95
0228-1	⅜" drill 3.3A 0-1000 rpm	154	85
0375-1	⅜" close quarter drill	208	115
0210-1	⅜" cordless drill 2 spd	204	125
0212-1	⅜" cordless drill v/spd.	263	149
6539-1	Cordless screwdriver 190 rpm	108	59
3102-1	Plmbrs rt angle drill kit	295	175
3002-1	Electricians rt angle drill	290	169
5399	½" D-hdle ham drill kit	299	165
1675-1	H.D. Hole Hawg w/cs	395	225
6511	2 sp sazsall w/cs	209	119
6405	8¼" circle saw	209	120
6750-1	Drywall gun 0-4000 4.5A	149	89
6798-1	Tek screwdriver	173	105
6226	2 sp bandsaw w/case	416	240
6234	TSC bandsaw w/case	427	240
6507	TSC sazsall w/case	219	129
6170	14" chop saw	430	219
6012	Orbital sander 3⅝"x7⅜"	179	100
6014	Orbital sander 4½"x9¼"	189	110
6305	6¼" cordless circle saw	284	155
6753-1	Drywall gun 0-4000 3.5A	129	73
8977	Var. temp heat gun	109	70
0214-1	⅜" v. spd. cordless drill	220	125
5397-1	⅜" v. spd. hammer drill kit	227	145
0211-1	⅜" cordless driver drill	217	120
5371-1	½" v. spd. hammer drill kit	313	199
3107-1	½" v. spd. rt angle drill kit	305	180
6754-1	Drywall gun 0-4000 4.5A	179	115
6232	4¾" bandsaw w/case	432	275
6747-1	Drywall driver-0-2500	149	85
0230-1	⅜" drill 0-1700 rpm	159	103
3300-1	½" v. spd. magnum rt angle kit	289	160
5620	Router 1 H.P.—8 amp	289	175
5660	Router 1½ H.P.—10 amp	299	180
5680	Router 2 H.P.—12 amp	350	220
5455	⅞" polisher 1750 rpm	199	125
5535	7" polisher 2800 rmp	209	130
6215	16" chain saw	280	140
8975	Heat gun	85	55
6366	7¼" circular saw	198	106
6368	7¼" circular saw	226	125
0216-1	2 spd cordless drill Hi-torque	222	139
0235-1	½" drill keyless chuck mag	199	122
6016	¼ sheet pad sander	75	40
6147	4½" sander/grinder w/case	182	110
8950	8 gal wet/dry vac	205	130
8955	10 gal wet/dry vac	279	189
0239-1	½" drill keyless chuck	189	115
6749-1	Drywall gun 0-2500 4.5A	189	122
6377	7¼" worm drive saw	275	155

FREUD SAW BLADES

⅝" Bore—Industrial Grade
CARBIDE TIPPED SAW BLADES

Item No.	Description	Diam.	Teeth	List	Sale
LU72M010	Gen'l Purp.	10"	40	78.49	35
LU82M010	Cut-off	10"	60	98.89	42
LU84M011	Combination	10"	50	85.25	37
LU85M010	Super Cut-off	10"	80	126.90	52
LM72M010	Ripping	10"	24	74.22	36
LU73M010	Cut off	10"	60	91.16	38
PS203	Gen'l Purp.	7¼"	24	31.42	19
PS303	Plywood	7¼"	40	37.74	22
DS306	6" Dado - Carbide			168.13	92
DS308	8" Dado - Carbide			205.89	108
F0	⅛"x⅝" Biscuits 1000-Qty.				25
F10	2⅛"x¾" Biscuits 1000-Qty.				25
F20	2¾"x1" Biscuits 1000-Qty.				25
FA	Assorts Biscuits 1000-Qty				28

MAKITA CORDLESS

Model		List	Sale
6070DW	⅜" var. spd. rev. 7.2v	123	65
6071DWK	⅜" var. spd. rev. w/removable batt	190	105
5081DW	3⅜" saw kit	243	130
5600DW	6¼" circular saw	317	167
6010DWK	⅜" cordless drill kit	155	89
6010SDW	⅜" cordless drill	103	55
DA3000DW	⅜" angle drill	238	130
6010DL	⅜" drill w/flashlight	198	113
6012HDW	2 spd. driver drill w/clutch & case'	224	109
6710DW	Cordless screwdvr kit	176	103
6092DW	V/spd. & case'	237	117
6093DW	V/spd. w/clutch & case'	248	119
6891DW	Drywall gun 0-1400	225	120
632007-4	9.6 volt battery	49	35
632002-4	7.2 volt battery	42	30
5007NBA	7¼" saw w/elec. brake	219	127
5008NBA	8¼" saw w/elec. brake	257	145
804510	Sander	97	45
9900B	3"x21" belt sander	254	138
9924DB	3"x24" belt sander w/bag	260	145
9035	½ sheet finish sander	100	53
9045B	½ sheet finish sander	204	109
9045N	¼ sht fin. sand. w/bag	206	110
4200N	4¾" circ. saw 7.5 amp	210	112
5201NA	10¼" circ. saw 12 amp	509	300
4301BV	Orb. v/sp jig saw 3.5 amp	268	145
JR3000WL	2 sp recip saw w/case	217	122
JR3000V	Vs. recip saw w/case	228	125
LS1020	New 10" mitre saw	426	219
9820-2	Blade sharpener	336	169
410	Dust collection unit	458	269
3705	Offset trimmer	240	125
1900BW	3¼" planer w/case	210	115
1100	3¼" planer w/case	381	199
9207SPC	7" sander-polisher	276	139
3601B	1⅜ H.P. router	228	120
3700B	½ H.P. trimmer	170	90
9501B	4" grinder	137	65
BO4530	6" round sander	102	55
BO4550	¼" pad sander w/bag	95	46
DA3000R	⅜" angle drill	234	130
DP4700	½" v/sp w/rev. 4.8 amp	192	110
5300LR	½" angle drill w/rev	315	176
2708W	8¼" table saw	432	250
2711	10" table saw w/brake	728	470
GV5000	Disc sander	120	67
6800DB	2500 rpm 3.5 amp	154	75
6800DBV	0-2500 rpm 3.5 amp	164	83
6801DB	4000 rpm 3.5 amp	154	75
6801DBV	0-4000 rpm 3.5 amp	164	83
2830N	12" planer/jointer	2836	1495
2040	15⅝" planer	2358	1240
1805B	6¼" planer kit w/case	609	340
JV1600	var. speed jig saw	209	125
JV2000	var. speed orb. jig saw	230	135
5005BA	5½" circular saw	202	113
9503BH	4½" sander-grinder	153	83
DP3720	⅜" drill rev. 0-1800 rpm	104	55
6510LVR	⅜" drill rev. 0-1500 rpm	153	69
6013BR	½" drill rev. 6 amp	224	125
5402A	16" circular saw - 12 amp	550	325
3612BR	3 H.P. plunge router	354	185
9401	4"x24" belt sander w/bag	302	165
3620	1¼ H.P. plunge router w/case	180	92
8419B-2W	½" - 2 spd. hammer drill	275	125
4302C	V/spd. orb. jig saw	272	155
5077B	7¼" Hypoid saw	254	145
LS1430	14" Mitre saw	624	439
2414	14" cut-off saw AC/DC	365	200
5007NB	7¼" circ saw 13 amp	196	114
3612B	3 HP plunge router sq/b	354	187

SKIL SIZZLERS

Model		List	Sale
5510	(551) 5½" circ saw	130	82
5625	(552) 6½" circ saw	164	108
5656	(553) 7¼" circ saw	164	108
5665	(554) 8¼" circ saw	165	118
5750	(807) 7¼" circ - drop fool	175	115
5765	(808) 8¼" circ - drop foot	204	130
5790	(810) 10¼" circ - drop foot	350	225
5825	(367) 6½" worm saw	257	139
5865	(825) 8¼" worm saw	283	149
4580	Vari - orbit jig saw w/case	120	82
3810	10" Mitre saw	349	179
595	3"x21" sander w/bag 5.5A	197	125
7565	¼" palm sander	62	41
2535-04	7.2V drill w/x-tra batt	142	97
77	7¼" worm drive	261	135
5350	2½ HP circ. saw	90	59
5250	2¼ HP circ. saw	66	49

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MODEL 2735-04—12 VOLT V/Spd. Cordless Drill complete w/case and 2 Batteries
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#C-15FB List 630.00 Sale 389.00

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LIST 181.00 Sale 115.00

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28-283F 14" Band Saw
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¾ H.P. motor
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PIRANHA By Black & Decker

CARBIDE TOOTH SAW BLADE

Model#	Diameter	#Teeth	List	Sale
73-756	6-1/2	36	26.90	16.30
73-717	7-1/4	18	11.72	7.10
73-737	7-1/4	24	14.92	9.00
73-757	7-1/4	40	27.40	16.35
73-758	8	40	39.90	24.15
73-759	8-1/4	40	40.66	24.60
73-739	9	30	29.52	17.85
73-769	9	60	64.40	38.95
73-740	10	32	30.98	14.00
73-770	10	60	64.90	25.00
73-715	5-1/2	16	13.25	7.30

STYLE 32 PONY SPRING CLAMPS

with coated tips and handles

Model	Size	List	Sale Ea.	Lots of 25
3201-HT	1"	1.79	1.10	24.75
3202-HT	2"	2.78	1.65	37.15
3203-HT	3"	5.09	3.00	67.50
3204-HT	4"	8.63	5.15	115.85

ADJUSTABLE HANDSCREWS BY JORGENSEN

Item No.	Jaw Length	Open Cap	List	Sale	Box of 6
#5/0	4"	2"	12.05	7.25	40.50
#4/0	5"	2½"	12.95	7.95	45.30
#3/0	6"	3"	13.88	8.35	47.60
#2/0	7"	3½"	14.92	8.95	51.00
#0	8"	4½"	16.61	9.95	56.70
#1	10"	6"	18.98	11.40	64.95
#2	12"	8½"	21.78	13.00	74.00
#3	14"	10"	27.62	17.50	99.95
#4	16"	12"	35.93	24.50	139.95

STYLE 37 2½" Throat ¼"x¾" JORGENSEN

Item No.	Jaw Length	List	Sale	Box of 6
3706	6"	8.27	5.50	29.70
3712	12"	9.17	5.95	32.50
3718	18"	10.12	6.85	37.50
3724	24"	11.07	7.35	40.00
3730	30"	12.35	8.25	45.00
3736	36"	13.49	8.95	49.00

PONY CLAMP FIXTURES

Model		List	Sale	Lots of 12
50	¾" black pipe clamps	11.68	7.50	80
52	½" black pipe clamps	9.73	6.00	65

STYLE J. ADJUSTABLE HANDSCREW KITS

Model	Length Jaws	List	Sale
J04	4	6.47	3.75
J06	6	7.38	4.25
J08	8	8.31	4.80
J10	10	9.69	5.75
J12	12	12	6.90

BOSCH

Model		List	Sale
1581VS	Top hdle. jig saw	235	129
1582VS	Barrell grip	220	119
1942	Heat gun 650°-900°	99	69
1272D	3"x24" B.S. w/bag	295	169
1273D	4"x24" B.S. w/bag	315	179
11-212	Bulldog ¾" SDS rotary	339	189
1196VSRK	⅜" vs hammer drill	205	110
1198VSR	½" vs hammer drill	219	125
1608	5.6 amp lam trimmer	135	75
1608L	Same as above w/trimguide	139	81
1608T	5.6 amp tilt base trim	155	89
1609	5.6 amp offset base trim	199	119
1609K	Lam installers kit w/1609	285	169

Offset base, trimmer tilt base, trimguide. ⅛" collet, collet nut, wrenches, hex keys and case

1601	1 H.P. 790 watt motor 25,500 rpm	159	95
1602	1½ H.P. 1000 watt motor 25,000 rpm	195	109
1603	1½ H.P. D handle 1000 watt	219	119
1604	1¾ H.P. 10 amp 25,000 rpm	219	119
1606	1¾ H.P. D handle 1120 watt	243	135
3258	3¼" planer w/blade guard 5.7 amp	205	119
3270D	3"x21" dustless belt sander 5 amp	219	129
1273DVS	Var spd. 4"x24" 6 speed range sander 10.5 amp	339	189
1611	3 H.P. plunge router	339	198
1651	7¼ 13 amp. circ. saw	179	105
1922K	Cdlss. jig saw w/case	239	169

WORKMATES BY BLACK & DECKER

Model		List	Sale
79-029	#85, 18#	57.95	39.00
79-032	#200, 23#	97.95	65.00
79-033	#300, 28#	107.95	70.00
79-034	#400, 35#	149.95	98.00

BLACK & DECKER!!!

Black & Decker Cordless

Model		List	Sale
1950	Hi-torque drill kit w/case	190	115
1980	Clutch scrudrill kit w/case	193	115
1987	V/spd. scrudrill kit w/case	209	125
1947	V/spd. hi-torque kit w/case	201	117

Black & Decker Deals

Model		List	Sale
2054	Versa clutch screwgun - teks & wd screws	232	140
2037	0-4000 5 amp drywall gun	160	92
1175	⅜" 0-2000 3.5 amp drill	96	54
2034	0-4000 4.5 amp drywall gun	138	87
4015	½ sheet sander 3 amp	190	109
2600	⅜" 0-1200 4.5 amp drill	119	73
4018	½ sheet sander 2.3 amp	122	74
3051	7¼" worm drive 13 amp	246	142
3027-09	7¼ circ. saw 10.5 amp	170	75
3103	2 spd recip w/case	190	95
3028	7¼" circ w/18 tooth carb blade	125	78
1703	10" mitre w/60 tooth carb blade	313	186
3047-09	7¼" super saw cat w/brake	270	164
3048-09	8¼" super saw cat w/brake	285	174
3157	Orb v/spd. jig saw	212	126
3153	V/spd. jig saw	205	123

AEG SPECIALS

Model		List	Sale
EZ505	7.2v cdls. drill, batt., chgr., 2-spd	150	79
EZ506	7.2v cdls. drill, batt., chgr., v-spd	194	120
SSPE800	8 amp., v-spd., orb., recip saw	209	130
SCRIE	5 amp., 0-2500, drywall gun	150	99
SCRIIE	5 amp., 0-4000, drywall gun	140	94

PORTER CABLE

Model		List	Sale
630	1 H.P. router 6.8 amp	165	110
690	1½ H.P. router 8 amp	205	115
691	1½ H.P. router D hdle	225	135
535	1½ H.P. speedmatic router	300	195
518	3 H.P. 5 speed router	520	338
520	3 H.P. 15 amp router	490	320
309	3.8 amp lam trimmer	135	90
310	3.8 amp H.D. lam trimmer	190	120
312	Offset base lam trimmer	205	130
319	Tilt base lam trimmer	221	145
595	1½ H.P. router/shaper	288	190
696	H.D. shaper table	150	105
351	3"x21" belt sander w/o bag	207	129
352	3"x21" belt sander w/bag	217	135
360	3"x24" belt sander w/bag	302	195
361	3"x24" belt sander w/o bag	282	170
362	4"x24" belt sander w/bag	317	205
363	4"x24" belt sander w/o bag	302	195
587	7¼" speedtronic 14.5 amp circ saw	220	145
315-1	7¼" lop handle 13 amp circ saw	185	105
617	7¼" pushhandle 13 amp	185	105
346-1	6½" lop handle 12 amp	166.50	115
368-1	8¼" lop handle 13 amp	195	131
314	4½" trim saw 4.5 amp	195	125
548	X HD bayonet saw	245	165
9548	X HD bayonet saw w/case	265	175
9629	Recip saw v/sp 8 amp	225	139
9627	Recip saw 2 speed 8 amp	215	133
666	⅜" H.D. vsp drill - Hdl	181	122
620	⅜" H.D. 4 amp 1000 rpm	140	83
621	⅜" H.D. v spd. 0-1000 rpm	148	90
320	Abrasive plane 3 amp	145	98
126	Porta plane 7 amp	280	185
9118	Porta plane 7 amp kit	315	209
653	Versa plane 10 amp	399	250
9652	Versa plane 10 amp kit	419	275
7545	0-2500 v spd. drywall gun 5.2 amp	163	100
505	½ sheet pad sander	157	99
7511	⅜" v spd. drill 5.2 amp	183	100
7514	½" v spd. drill 0-750	188	120
303	Paint remover	220	150
304	7" disc sander 4000 rpm	157	125
305	7" disc polisher 2000 rpm	157	125
367	3¼" planer 6.5 amp	225	135
537	1½ H.P. D hdle router	315	205
7548	Top hdl jig saw 4.8 amp	205	135
7648	Barrel grip jig saw 4.8 amp	205	135
330	Speed block sander ¼ sheet	97	54
555	Plate biscuit joiner 5 amp w/case	269.95	162
345	6" saw boss 9 amp	154.50	99
5060	"Stair Ease" stair templet	194	125
5061	"Stair Ease" hard wood stair templet	204	135
655	0-4000 drywall gun 4 amp	125	74
7540	0-4000 5.2 amp gun	158	99
100	⅞ H.P. router	155	100
59381	Door hanging kit	224	152
399	Drywall cutout unit	104.50	69
43218	Drywall cutout unit replacement bit	6.75	5.50
5008	Dovetail template kit	95	69
97650	½" v/spd hammer drill w/case	221	149
5009	Mortise & Tenon jig	49.95	38
	STICK IT PAPER		
13599	Dispenser	11.95	9
	80 grit paper 10 yd roll	13	9
	100, 120, 180, 220 10 yd roll	11.50	8

FREE FREIGHT TO THE 48 CONTINENTAL STATES ON EVERY ITEM.

TOUGH ENOUGH

As winter comes on, a lumberjack adds layers of clothing to keep warm, but how does a tree fight the cold? Researchers have found that some species have a conservative strategy—they tolerate minimum temperatures no lower than the minimums they're likely to face where they put down roots. Oregon white oak, for instance, survives when the thermometer reads about –4° F, but sustains injury if the mercury dips any lower.

Other species possess a much greater freezing tolerance than seems at all necessary. In experimental conditions, the northern white cedar, the white spruce, and the balsam poplar defy a staggering –112° F!

Some trees adjust to whatever fate gives them. The eastern white pine can't stand temperatures lower than –38° F in Tennessee, yet shrugs off a bark-numbing –128° F standing in Minnesota.

CARVERS CONVERGE

Gas up the car. The National Woodcarvers Showcase '88 opens at Silver Dollar City, Branson, Missouri, on September 16. For two weeks, carvers meet, eat, talk, show, sell, and share. A juried competition pits carvers in two divisions and 14 categories. For more information, call 417/338-8188, or write: *National Woodcarvers Showcase, Miss Sue, Entertainment Division, Silver Dollar City, Inc., Branson, MO 65616.*

THINNER IS BETTER

In Washington State, thinned plots of Douglas fir produced trees that yielded 7% more board feet of lumber and 22% more total wood than unthinned plots.

GIVE HER A SAWDUST BOUQUET

How do you describe the smell of wood? In most cases, "nice" or "not so hot" prove adequate. A few types of wood, however, can be compared to scents most everyone knows. Freshly cut rosewood smells like roses. Teak smells like old shoe leather. West Indies satinwood will remind you of coconut oil, and an African species called Dahoma reeks of pure ammonia.

Don't bother with essia, another African wood. It smells like rotten cabbage.

BUT WHEN DO THEY GO ON SALE?

When you want to show the world you have fine taste in automobiles, and the bank account to match, you might buy a Rolls-Royce. A status-conscious woodworker, however, could opt for a Reinhard table saw, a handcrafted, detailed machine definitely in the luxury class.

The 1988 price for this Swiss manufacturer's top-of-the-line table saw: $26,950. Of course, that's with the electronic fence. If you settled for a regular fence, you could snap up the PKS350 from the U.S. importer for a mere $20,950 (shipping not included).

The Swiss-made Reinhard PKS250 table saw. Price: $15,950.

Mahogany Masterpieces, the Suncook, New Hampshire-based distributor for the U.S. and Canada, sold just two Reinhard table saws last year—one to a Wall Street executive and one to a West Coast computer company owner. However, both saws were the smaller, more economically priced, tilt-table PKS250 model, which sells for $15,950.

At the small Reinhard firm in Huttwil, Switzerland, Old World precision craftsmen build the saws one at a time. In addition to the no more than 10 table saws produced per year, Reinhard also makes drill presses and other woodworking machinery, and industrial equipment.

Don't wait too long to place your order. Prices of these Swiss saws shot up by as much as $4,000 from 1987 to 1988. And, allow for an extended delivery date—limited production means a wait of 6 to 12 months.

Illustrations, Jim Stevenson Photograph courtesy of Mahogany Masterpieces

MORE POWER TO YOU.

With Makita cordless power tools anything is possible. You can turn raw lumber into finished furniture. Add a new room to your house. Even build a new house.

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Maybe it's because we have the industry's broadest cordless tool line.

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What harm can a little water do?

Ordinary Paint: Water pools and soaks in.

New Rust-Oleum Wood Saver: Water beads and runs off.

Ordinary paint can't defend against the damaging effects of water and time. Fortunately, now there's new Rust-Oleum Wood Saver™ paint. A special wood formula with TEFLON* for twice the moisture protection of ordinary paint. To prevent cracking, peeling and warping. Try new Rust-Oleum Wood Saver paint. In convenient brush sizes. Handy aerosols. And wonderful colors. Let Rust-Oleum Wood Saver go to work on your wood. Before water does.

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If it's going to get wet, get Rust-Oleum.™

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